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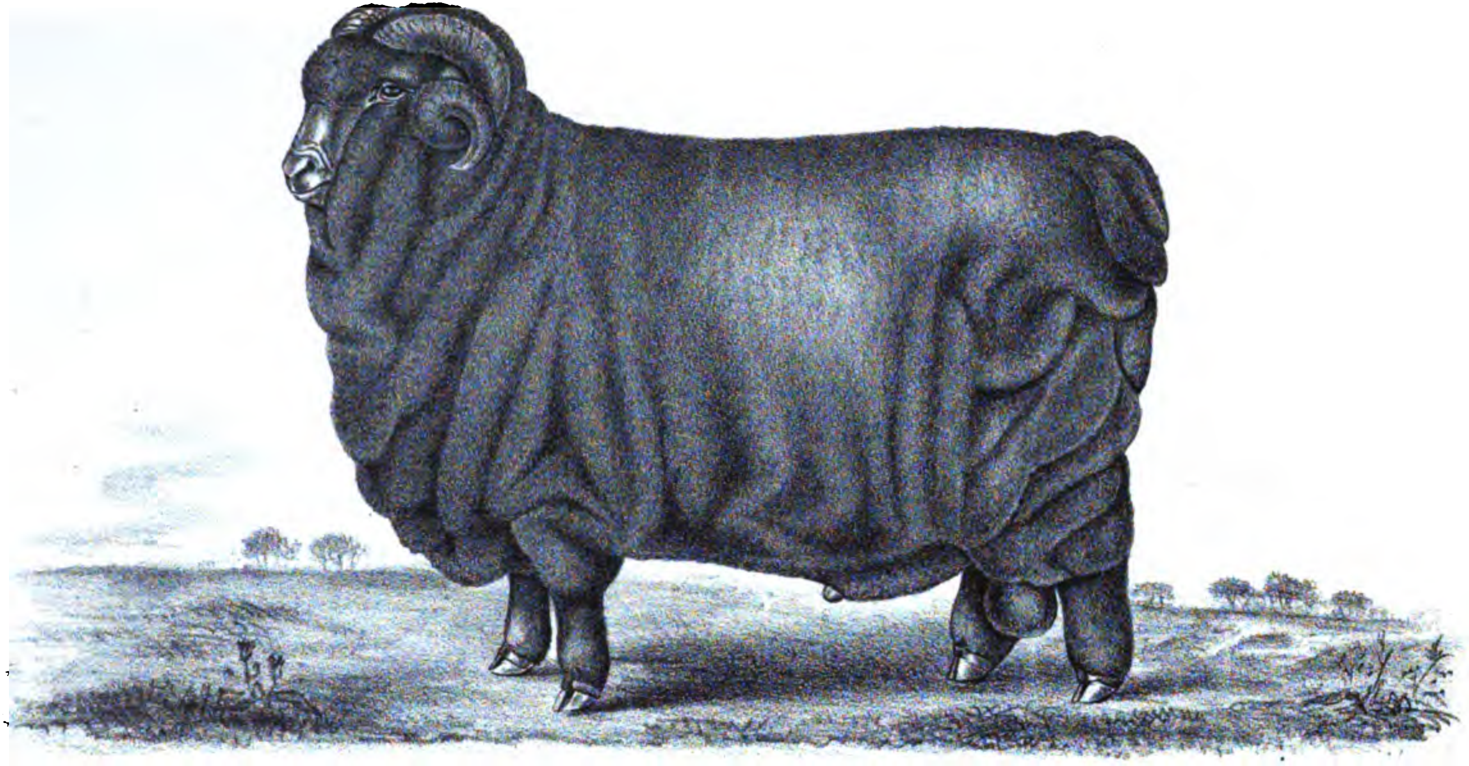

DON CARLOS

An Infantado Ram, bred and owned by Robert Vanvoorhis,
Monongahela City, Pa.

[illegible]

1879.

THE COMMONWEALTH OF PENNSYLVANIA.

AGRICULTURE OF PENNSYLVANIA,

CONTAINING

REPORTS OF THE STATE BOARD OF AGRICULTURE, THE STATE AGRICULTURAL SOCIETY, THE STATE DAIRYMEN'S ASSOCIATION, THE STATE FRUIT GROWERS' ASSOCIATION, AND THE STATE COLLEGE,

FOR 1878.

HARRISBURG:
LANE S. HART, STATE PRINTER.
1879.

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SECOND ANNUAL REPORT

OF THE

PENNSYLVANIA BOARD OF AGRICULTURE,

FOR THE YEAR 1878.

STATE BOARD OF AGRICULTURE, 1878.

Members Ex-Officio.

His Excellency Governor John F. Hartranft.
General William McCandless, *Secretary Internal Affairs.*
Prof. J. P. Wickersham, *Superintendent Public Instruction.*
Hon. W. P. Schell, *Auditor General.*
Rev. James Calder, *President State College.*

Appointed by the Governor.

		Term Expires.
Hon. John P. Edge,	Downingtown,	1880
Col. James Young,	Middletown,	1879
Hon. John L. George,	Monongahela City,	1881

Elected by County Agricultural Societies.

Berks,	W. G. Moore,	Womelsdorf,	1880
Blair,	T. Banks,	Hollidaysburg,	1879
Crawford,	M. C. Beebe,	Pleasantville, (Venango co.)	1880
Centre,	J. Hamilton,	State College,	1879
Cumberland,	C. H. Mullin,	Mt. Holly Springs,	1879
Lancaster,	H. M. Engle,	Marietta,	1880
Indiana,	G. W. Hood,	Indiana,	1880
Luzerne,	J. B. Smith,	Kingston,	1879
Northumberland,	J. McFarland,	Watsontown,	1879
York,	W. S. Roland,	York,	1880
Tioga,	S. F. Wilson,	Wellsboro',	1879
Lycoming,	D. H. Foresman,	Williamsport,	1879
Franklin,	C. Gilbert,	Chambersburg,	1880
Bradford,	L. J. Culver,	Towanda,	1880
Warren,	J. H. Hiller,	North Warren,	—
Susquehanna,	J. C. Morris,	Friendsville,	1880
Adams,	E. G. Fahnestock,	Gettysburg,	1879
Schuylkill,	J. S. Keller,	Orwigsburg,	1881
Beaver,	R. S. Sterling,	Beaver,	1881
Montgomery,	W. A. Yeakle,	Flourtown,	1881
Mercer,	A. Robinson,	Mercer,	1881
Union,	J. W. Shriner,	Lewisburg,	1881
Bucks,	E. Reeder,	New Hope,	1881
Juniata,	D. Wilson,	Port Royal,	1879
Lehigh,	J. P. Barnes,	Allentown,	1881
Greene,	M. R. Wise,	Waynesburg,	1881
Chester,	Thomas J. Edge,	Londongrove,	1881
Somerset,	C. C. Musselman,	Somerset,	1880

OFFICIAL LIST.

President.

His Excellency Governor John F. Hartranft.

Vice Presidents.

Prof. J. P. Wickersham,
Col. James Young,
M. C. Beebe.

Executive Committee.

His Excellency John F. Hartranft,
John P. Edge, Chester,
John L. George, Washington,
E. G. Fahnestock, Adams,
H. H. Engle, Lancaster,
Prof. D. Wilson, Juniata,
Prof. J. Hamilton, Centre,
W. S. Roland, York,
A. Robinson, Mercer,
Thomas J. Edge, Chester.

Advisory Committee.

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Prof. D. Wilson, Juniata,
W. S. Roland, York.

Secretary.

Thomas J. Edge, Chester.

Botanist.

Thomas Meehan, Germantown.

Pomologist.

Josiah Hoopes, West Chester.

Chemist.

Prof. F. A. Genth, University of Pennsylvania.

Entomologist.

Prof. W. A. Buckhout, State College.

Veterinary Surgeon.

Dr. Charles B. Michener, Carversville.

Microscopist.

Dr. Henry Leffmann, Philadelphia.

Mineralogist.

Prof. F. A. Genth, University of Pennsylvania.

Geologist.

Prof. J. P. Lesley, State Geologist.

REPORT.

OFFICE OF THE PENNSYLVANIA BOARD OF AGRICULTURE,
HARRISBURG, *January 1, 1879.*

To the Honorable Senate and House of Representatives of the General Assembly of Pennsylvania:

GENTLEMEN: In compliance with the requirements of law, and in accordance with the direction of the Board, I have the honor to herewith submit a detailed statement of the work of the Pennsylvania Board of Agriculture during the past year.

The nature of the work of the Board is such that its best aims and the greatest amount of benefit to the farmers of the State can only be accomplished by having them directly interested in its proceedings and assisting in its work. The experience of the previous year having plainly demonstrated that we could scarcely expect them to meet with us at the State capital, and the Attorney General having given an opinion favorable to the plan, it was decided to hold the meetings of the Board in various portions of the State, in order, if possible, to reach all interests and all sections. In accordance with this plan, a meeting was held at Doylestown in May, and one at Titusville in September. In both cases the result fully warrants the opinion that by this plan we can best carry out our work, and accomplish the greatest amount of good to the greatest number. The farmers of the districts in which these meetings have been held have shown their appreciation of our efforts, not only by their attendance, but also by freely participating in the discussion of the various topics under consideration, thus adding their practical knowledge and suggestions to the general result. These meetings have not only the effect of bringing new facts from practical men, but they also have a tendency to break up that spirit of exclusiveness into which our farmers have unconsciously drifted. During the past year four agricultural societies have taken advantage of their privilege of electing members of the Board, and it is probable that as many more will, in the same manner, be added during the year which has just opened. The manner of holding the meetings, as alluded to above, and the addition to the number of members, has very materially increased the expense of our meetings, but this increase has been accompanied by a greater increase in the ability of the Board to accomplish the purposes for which it was created.

The Cultivation of Jute in Pennsylvania.

The communication on the subject of jute culture in Pennsylvania, as laid before the Legislature during the session of 1878, has had the effect to arouse an interest in not only the culture of this plant, but also of other textile fibers. Believing it to be the duty of this Board to take the initiatory steps in the investigation of new problems in agriculture, an investigation into the merits of the jute plant was ordered. The fact that, as a nation, we import jute fiber to the amount of $7,000,000 annually is, perhaps, a sufficient reason for this interest, and also for the investigation of the subject by this Board. After a voluminous correspondence with practical men, we feel warranted in coming to the conclusion that, as the facts are now presented, the true jute plant—*Corchorus capsularis*—cannot be profitably cultivated in Pennsylvania. *First.* Because it is a semi-tropical plant, and, as appears from correspondence hereunto annexed, will not mature its seed, even in South Carolina, without some kind of protection. *Second.* Because the quality and strength of the fiber decreases as its culture progresses north. *Third.* Because, in the present condition of machinery adapted to its preparation, it would be impossible for our farmers to compete with the low-priced manual labor of India. No doubt, as has been claimed, this plant may in time be gradually acclimated, but this involves a question of the future, which the Board has not felt called upon to investigate.

The correspondence and personal examination necessary to establish these facts has also developed the fact that we already have several native or acclimated plants, which will produce a fiber equal or superior to that of India jute, and we have no doubt that energy directed to the improvement and cultivation of these, will meet with a greater reward than in the acclimatization of the *Corchorus capsularis.* Prominent among these we may name the Mallow family, and notably the Indian Mallow, (*Abutilon avancennœ,*) and the wild primrose, (*Oenothera biennis.*) The former grows wild in nearly all portions of the State, and from samples already in the possession of the Board, it is evident that it may be made to yield a fiber fully equal to that of jute, with this advantage in its favor, that the residue may be used for the manufacture of paper.

The Board has been requested to lend its aid in asking for a bounty from the State to encourage the cultivation of these and other textile fiber plants; but believing that such aid partakes more of the nature of a stimulus than of actual assistance, we are not prepared to advise it. Should a basis for profitable competition with India fiber *be shown*, we have no doubt that the energy of our manufacturers and our unemployed capital now seeking investment, will take advantage of it. The effect of State bounties for such objects is too often to give the project an undue and unnatural stimulus, which seemingly carries it forward in a proper course, but when withdrawn, it will result in the complete abandonment of the project. The best stimulus for this and other new crops, is a clearly demonstrated profit. With this it needs no State aid, and without this no State aid can make it truly and fairly successful.

The Guenon System.

During the last three months of 1877, our correspondence with official reporters, farmers' clubs, and practical farmers, demonstrated the fact that there was a strong desire for an impartial examination into the merits or demerits of this system, and for a report thereon by the Board. While many of our dairymen and stock-breeders have implicit faith in the system, there are others who either fail to place entire confidence in its teachings, or discard them as incorrect and imperfect.

Believing that *if correct*, its test by the Board would be of benefit to the dairyman and farmers of the State, by spreading its benefits still further, and that if incorrect and delusive, its examination would confer a benefit by exposing the delusion, a resolution was unanimously adopted, requesting his Excellency the Governor, as president of the Board, to appoint a commission of three experts to carefully investigate into, and report upon the merits of the system. For this purpose, Messrs. Blight, Harvey, and Hazard were appointed. They have examined a large number of cows; have, as they and we think, given the system a fair and full test, and their report, which is herewith submitted, is before the farmers of the State. It is our belief that the interests of the dairymen of the State can be best served by a presentation of the naked facts as found by the commission, leaving it to them to draw their own conclusions as to the correctness or falsity of the system.

The work of the commission as it progressed, has been subjected to considerable criticism, not only from the agricultural press of this and other States, but also from practical men, who are interested upon one side or other of the controversy, but we think no one can claim that it has not had a fair test. By this the Board proposes to let it stand or fall, without endorsement or condemnation from them. The examinations were publicly made, and opponents as well as friends of the theory invited to be present, and the result is now left to the practical dairymen and stock-breeders for their independent action thereon. The gentlemen comprising the commission have acted without any compensation, even for their personal expenses, and the examination has placed a large amount of additional labor upon the secretary of the Board.

Commercial Fertilizers.

We would again call your attention to the importance of protecting the agricultural interests of the State from fraud and imposition, in the manufacture and sale of commercial fertilizers. The report of our chemist plainly shows that fertilizers are offered for sale in the State which are not worth one fourth of the price asked for them, while there are others which are fully worth all that is demanded for them. The purchaser and consumer has, at present, no means by which to determine this value and the comparative merits of these fertilizers but that of actual test, yielding its results too late to remedy the evil or redress the wrong. The surrounding States of New Jersey, Delaware, and Maryland, have placed the manufacture and sale of this class of manures under the restrictions of laws, which not only, in some measure, protect the farmer, but, also, the honest manufacturer. As the result of this protection afforded in the neighborboring States, Pennsylvania is a market for all kinds of fraudulent manures, which cannot be offered elsewhere. It is against these, rather than the product of our leading home manufacturers, that our farmers need protection, and we think you will find that the manufacturers of reliable fertilizers will endorse any law, which, while it protects the farmer, also protects them.

The law prepared by this Board, and submitted to the last Legislature, was the result of a careful examination of the laws of other States, and consultation and correspondence with those familiar with the action of this class of laws elsewhere. This correspondence and the experience elsewhere, we think, clearly demonstrates that any legislation, to be effective, must possess the means by which samples may be selected from stock already in the market, and analysed by an impartial and disinterested party. The regular report of these analyses, at stated periods, will furnish farmers with an index of the *actual value* of each manure in the market, and enable them to form an intelligent judgment of their value and adaptation to their special wants. We think it safe to urge, in support of some definite action on this subject, that out of not less than $1,500,000 expended by our farmers for forty-five thousand tons of fertilizers, at least one fourth is a direct loss from fraudulent goods.

The Unimproved Lands of the State.

The fact that our State has within its limits a large area, comparatively well adapted to the production of grain and grass, but not yet brought under cultivation, has had the attention of the Board. From examinations made by members of the Board, there can be no doubt that much of this land (classed as unimproved) might be made productive, by a proper and judicious system of improvement, and that it in no way differs in condition from the former status of many of our most flourishing interior and northern counties. Much of the land of Cameron, Venango, Elk, and Potter counties, will, in the future, compete with that of Bradford, Crawford, and Mercer, but it is possible that this time may be hastened by some proper system of legislation. In many localities the large areas from which the pine and other timber has been removed has a productive value which will fully warrant its improvement, and data in the possession of the Board show it to be capable of producing remarkable crops of grain, roots, and grass. A good and ready market already awaits the farmer who will improve them.

It has been claimed that one of the leading drawbacks to the improvement and settlement of this class of lands is to be found in the fact that, if improved, even to but a limited extent, their value for taxable purposes is very much increased. The State and counties in which these lands are situated could very well afford to delay this increase in taxable value until the occupant has had time to become fairly established. It is to the interest of both the State and land owner that these lands should be improved, for such improvement will, sooner or later, increase the revenues of both. For further information on this subject, we would refer you to the address of Honorable A. J. Quigley, before the September meeting of the Board, as herewith submitted.

Fence Laws.

As will be noted in the report which is herewith submitted, a committee of the Board, appointed to examine into and report upon the fence laws of the Commonwealth, have performed this duty. We would respectfully call your attention to the great change which has taken place in our agriculture since even the later of these acts was passed, and also to the fact that they do not correspond with the requirements of our present system of farming, nor with the improved systems which must, sooner or later, force themselves upon our farmers. When these laws were placed upon our statute books, the theory prevailed that the true object of a fence was to keep stock out; but this has, in most localities, been exchanged for the theory that they are to keep stock in, or, in other words, that a farmer fences to confine his own stock, and not to exclude that of a neighbor.

Disease among Live Stock.

Up to the time of closing our report, the live stock of the State has been free from any epidemic disease needing the attention of the Board. Except cases of hog cholera in Mifflin and a few other counties in the State, the general health and condition of the live stock has been better than last year. This is probably largely due to the fact that the winter of 1877 was of a nature as to present a large surplus of feed during the early spring, thus giving the pasture a start which has since kept the stock in a condition above its average. The horned stock along the lines of our leading railroads will no doubt be subjected to the usual annual loss from Texan or spleenic fever, but at so late a period in the season, no serious outbreak is to be anticipated. The annual loss from this disease forms in the aggregate quite a serious loss to the live stock owner, and the propriety of suggesting some form of legislation which will prevent, or at least mitigate, the danger has had the careful attention of the Board. As an index of what has been accomplished in other States, and what may be done here, we would refer you to the report on this disease by C. B. Michener, the veterinary surgeon of the Board, as embraced in papers herewith presented.

The official reporters appointed by the Legislature having called our attention to the loss entailed on the dairy interests of the State by ropy or viscid milk, Doctor Leffmann, the microscopist of the Board, has been detailed to make an investigation and report The result is herewith submitted.

The universal approbation with which this attempt to investigate the diseases of domestic animals, and to render assistance to farmers whose stock may be affected by epidemic or endemic diseases, has confirmed the opinion as expressed last year, and it will in the future form an important feature in the work of the Board.

While it is to be hoped that our farmers may not be subjected to the loss entailed by any general epidemic disease, yet the fact that we are each year more liable to it, leads us to believe that the small amount granted the Board for the purpose of this kind of investigation is well expended.

Value of the Office of the Board as a Source of Information to Farmers.

In our last report we called the attention of the Legislature to the value of this office as a center not only for the collection of agricultural information, but also for its dissemination among those who are more directly interested. Another year's experience has fully confirmed our estimate of this value, and it has formed no small portion of the duty of the secretary of the Board to answer inquiries from farmers and others from all portions of this as well as other States, often, it is true, upon matters of little import to the State, but of much value to the individual and, in the aggregate, to the State at large. The increasing labor of this and other duties will make it necessary that the secretary should have some kind of clerical help during the year now opened. While we do not think this will require the constant presence of an assistant, yet we would respectfully urge the importance of some provision for assistance during that portion of the year when the duties are most arduous.

Crop Statistics.

In an attempt to secure reliable information as to the yield and condition of the crops of the past season, the secretary has had the assistance of three hundred official reporters, who were appointed by the members of the Senate and House of Representatives, and are thus able to report for each senatorial and congressional district in the State.

Blanks are furnished to these reporters every quarter, and when returned, properly filled up, constitute the basis of the statistical tables herewith submitted. These reporters have been named for the positions on account of their qualifications for the duty, and it is believed that their consolidated returns are as nearly correct as it is possible to obtain without a more complicated and expensive plan.

The Season.

The spring of 1878, will long be remembered by the farmers of our State as one of the most favorable for farm work and for farm stock of any during the last two decades. Following a winter marked with but few sudden variations of temperature, it found the teams in good order for spring work. Opening unusually early, and with continued good weather, the corn and other spring crops were put into the ground in the best of order, and the freedom from hurry, which always follows an early spring, was a cause of a more thorough preparation of the soil. The spring rains were delayed until the latter part of May, and thus added materially to the advancement of farm work. Until the second week in May, everything seemed to be favorable for large crops, but, soon after this date, a change came over the reports sent in by our correspondents, and our usually sanguine reporters in Susquehanna, Wayne, Bradford, Tioga, Potter, and Erie counties furnished us with accounts of damage done by cool weather and frost. The greatest damage was, of course, in the northern tier of counties, but, even as low down as Lehigh, Schuylkill, Juniata, Mifflin, Blair, Cambria, Indiana, and Allegheny, the fruit crop was, at first, given up as an entire failure. Reports at hand since then (as will appear under the proper heading) have changed this to a great extent, but the loss to the fruit crop has, nevertheless, been heavy.

In some portions of the State frosts were reported as late as June 10, but only as affecting the lowlands and valleys, and in all cases orchards and vineyards in low situations have suffered most.

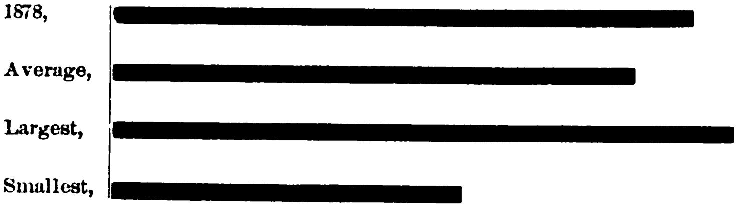
During harvest (especially hay harvest) the weather was fine, and we doubt if (taking the State as a whole) the entire harvest was ever housed in much better condition. From the eastern portion of the State we have some complaints of hindrance from showers, but not until after wheat harvest, and, even then, not to an extent to cause any damage to the crops. In some of the north-eastern counties the rains seem to have done considerable damage during wheat harvest. In the extreme south-east this favorable weather extended over the whole harvest, and, in fact, until the pastures were needing rain badly, except for the help afforded by the second crop of clover, many of our dairy farmers would have been short of pasture.

Wheat.

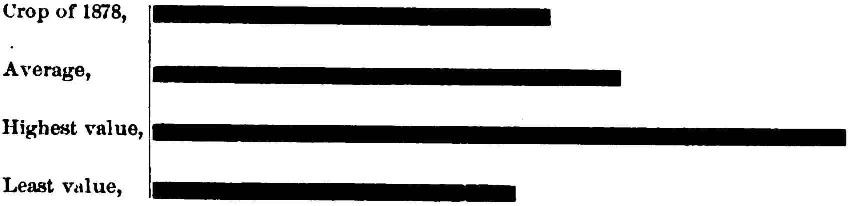
From nearly every county in the State we have reports of damage to this crop, from both fly and frost, and a careful reading of these reports and notes will convince us that our farmers have received their usual annual lesson in favor of later seeding. Our older farmers can readily go back in memory over several regular stated cycles, in which the cry of damage by fly is heard, and they can also tell us that each of these infected periods has been followed by later seeding, which, while it has been persevered in has prevented a repetition of the trouble, at least to any injurious extent. After a period of total or partial exemption from the ravages of fly, our farmers gradually commence to seed earlier, until, in some extreme cases, the grain is in by the last of August. Such a course is an invitation which the fly is not slow to accept, and the usual trouble follows. Just how late the seeding may be put off, and yet be followed by reasonable expectations of a crop, seems very much to depend upon the season and condition of the soil. On heavy manured and well worked land it will do much later. A majority of our reporters seem to fix on the middle of September as the dividing line, but a few report the almost total loss of crops sown even this late. We think that in all the counties of the State, there are not a few fields in which the heads are only partially filled. Grains are wanting at both the base and point of the head. In many cases the failure may be due the effects of frost. In many cases where this defect is noticeable, a further examination will show an extra grain in some of the middle chests near the center of the ear, but these are not usually so numerous as to make up for the deficiency at either end. It is too often the case that the estimate of yield is based solely upon the number and length of the heads. While these are, of course, important items in a correct estimate, yet the presence of three grains on a side, instead of two, or the absence of two or three at the point of the head, have much to do with the crop. Observation will often show that the heads on ground sparingly manured, are quite as long as those upon adjoining ground well manured, and yet the latter may contain forty or fifty per cent. more grain than the former.

As was intimated in our report for the quarter ending August 31, the November estimate of this crop are lower than those of July. The main cause of this decrease is to be found, in the fact that the large yield of straw led many of our reporters into the error in the probable amount of grain. Since most of the crop has been threshed out, the reduction has been found necessary.

We may make the following comparison, to show the relation of the crop of 1878 to that of the average of the past ten years, and also to the largest and smallest crops of the same period:



When value is taken into consideration, we may institute the following comparison:



The crops of 1878, though only exceeded in the total number of bushels by one crop during the past ten years, has its comparative total value placed very low, on account of its low price per bushel.

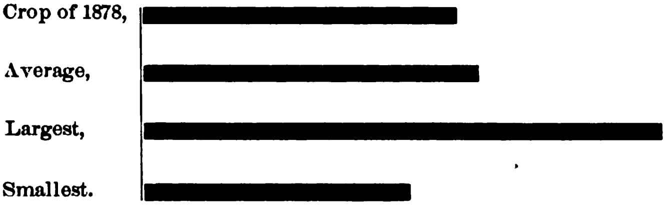
Oats.

This crop shows a large yield in bushels, but continued dry weather about the time it should have been filling has, in many cases, very materially decreased the weight of the product So far as the crop has been threshed we have the same report of a falling below the State standard in weight.

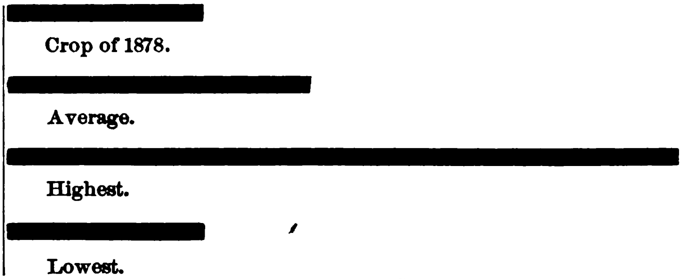
There are, perhaps, few crops planted by our farmers which receive so little manure and care in the preparation of the soil as this, and at the same time there are but few, if any, which more quickly respond to both careful preparation and manure. Many of our farmers who are very particular in the selection of their seed corn and wheat, sow their oats just as it comes from the machine. Many who, for fear of heating in the mow, place their seed wheat upon poles over the floors, will yet put their seed oats, (a grain which of all others is most liable to injury from heating,) in a large mow with the main crop, and often wonder why three bushels of seed per acre will produce so much better stand some years than others. A careful preparation of the ground, a little phosphate or bone, (even but one hundred pounds per acre,) drilled in with the seed, will produce an effect on the crop which will be more remunerative than the same amount or value of work and manure applied to almost any other crop. If the same care and manure is given to this crop which we usually give to corn and wheat, we think we will have a less number of correspondents reporting oats as "a crop which costs more than it comes to."

In many of our dairy counties the opinion is prevalent that oats and oats straw are disadvantages as producers of milk and butter, and hence Hungarian grass, millet, and sowed corn have been substituted for this crop. The effect upon milk and butter is very conflicting, and will not yet warrant the correctness of this conclusion.

The crop of 1878, when compared with the average yield of ten years, and with the largest and smallest yield during the same period, may be thus represented:



When compared in the same manner, in accordance with the market value we have the following:

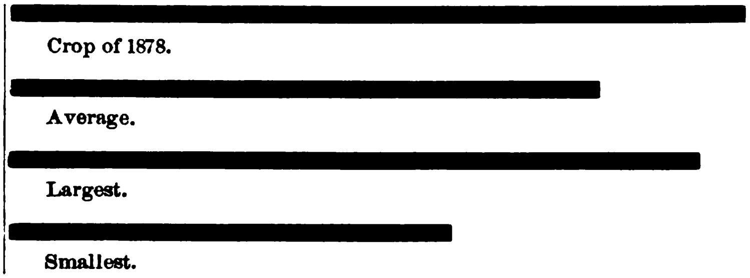


Hay.

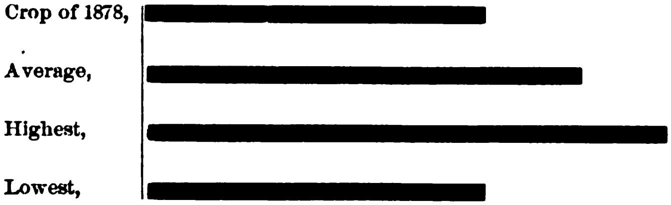
The hay crop of 1878, will long be remembered, not only for its large yield, but also for its fine quality. Grown without too much wet weather, it will be found to possess a feeding value which has seldom been excelled, and to this we may add the fact that in the absence of wet weather during harvest, it was secured in the very best condition. The only drawback to the value of the crop, is to be found in the fact that the early and rapid ripening of the wheat, caused many to leave the hay, to house the grain, and thus many fields were allowed to stand until the proper period for cutting (so as insure the best quality of hay) had passed. We doubt whether our oldest and most experienced farmers can re-call a year when our State had more hay stored up than at present. The mild winter of 1877–8, followed by an early and open spring, caused our farmers to turn out to pasture at an earlier date than usual, and hence more than the average amount of old hay was left over. In some cases this surplus was sold at a price below the cost of production, but in most cases it was retained, and thus swells the result of 1878.

This crop, when valued at its market price, is one of the most valuable produced in the State, but when fed on the farm, it is too often the case that this value is not obtained. Improvements in presses and a decrease in the rates of freight, accompanied by the increased use of artificial fertilizers, are slowly widening the area in which hay may be grown as a market crop. For many years hauling by wagon limited the circumference of the circle, but since ten tons of packed hay may be put into an ordinary freight car, the area has been increased in radius at least forty miles.

When compared by total yield with the crops of preceding years, we may represent the crop as follows:



When compared in a similar manner by total value, the result is as follows:



Corn.

The early estimates for this crop were the most encouraging we have yet received. The early spring gave our farmers plenty of time to get the ground in nice order; and, if care in planting would insure a crop, the corn crop of 1878 should have exceeded all others. Until the second week in May, we continued to receive very flattering reports of its appearance and condition. Commencing with the north-eastern counties and rapidly extending along our whole northern border we soon received accounts of serious injury from frost. In some cases this was so great as to cause an entire re-planting of the whole crop, and it is a question whether it would not have been in a better condition, if it had *all* been re-planted especially in the northern part of the State. Reports of damage from this cause soon became so general as to indicate that June would make up for the good weather in May. Damage from frost was reported as late as June 10, but as a general rule, the injury was done during the last week in May or the first in June. As a natural result, (even where the stalks were not killed to the surface of the ground,) the crop was very backward, but, owing to favorable weather, recovered some of its lost ground, and has warranted our reporters in increasing their estimates.

In many counties the stand is good, though short, but some counties report a very poor stand, even on good land, where the crop was not injured by frost. In some cases the seed failed to sprout properly, and in others, even where it seemed to start healthy, it soon dwindled away. In most cases this trouble was due to the ravages of the "spindle worm," (*Gortyna zea*,) the larva of which effects an entrance into the small stalk, at or near the surface of the soil, and burrowing into the spindle or center stalk, there passes into its chrysalis state, and either very much retards or kills the plant. In some portions of Lancaster and Chester counties, much damage was done by a species of aphis, which, in many cases, destroyed the plants in spots over the whole field. In these and adjoining counties, some damage was done by the "corn weevil," (*Rhyncophorus immunis*,) samples of which were sent to this office. In many cases the second planting will make but little else than fodder.

A greater care in the selection and care of their seed corn, would richly repay our farmers, and if accompanied by a more liberal use of grain in planting, would do much to raise the average of our crops. It is not often the case that the re-plant produces even half a yield of grain, and the only remedy is to be found in the care of the seed, accompanied by liberal planting.

Potatoes.

Owing to its liability to be affected by too much or too little moisture, this crop seems to be one of the most uncertain produced; and yet, a careful examination of its yield and value, for the past eight years, proves that these fluctuations have not been so great as might have been supposed.

In very many cases the first planting almost entirely failed to grow, and a second planting had to be resorted to, thus retarding the crop. In nearly every county of the State more or less injury was done by May and early June frosts. The early crop, in spite of these drawbacks, was good, in not only yield, but also in quality. The later crop was shortened by a want of moisture, but in quality is good.

The Colorado beetle, though reported worse in some localities than during any previous year, has done much less damage in the State at large than usual. This is due, we think, to the fact that our farmers are learning the habits of this pest, and to the skillful use of Paris green and other remedies. The great importance of the thorough destruction of the first or breeding crop of beetles, is becoming more generally understood, and is, undoubtedly, the key-note of success.

At one time, during the past spring, the demand caused by the necessity of re-planting doubled the price in the market, but as soon as the supply was obtained, prices fell to very near their old mark.

Some of our reporters mention a few cases of loss from decay, but further examination shows this to have been mainly confined to such as have been stored in a damp state, and in large piles.

In quality the crop is good, and in a few favored localities, where local rains furnished sufficient moisture, the yield is excellent; but these areas are too limited to have much effect upon the total crop.

For a more definite view of the condition of the crops and live stock of the State, as shown by counties, we would refer you to the statistical tables herewith connected, and for more definite information as to the work of the Board during the past year, to the accompanying documents, proceedings, and essays. All of which are respectfully submitted.

By order of the Board.

THOMAS J. EDGE,
Secretary.

PROCEEDINGS

OF THE

PENNSYLVANIA BOARD OF AGRICULTURE.

CONDENSED FROM THE MINUTES.

At a meeting of the Pennsylvania Board of Agriculture, held in the Senate chamber, Wednesday, January 23, 1878,

Board called to order at half past two o'clock, P. M., by His Excellency the Governor, in the chair.

Present: His Excellency the Governor, and Messrs. Wickersham, Calder, Edge, Young, Hood, Robinson, Morris, Beebe, Barnes, Moore, Hamilton, Fahnestock, D. Wilson, Roland, Sterling, Reeder, Gilbert, Foresman, Yeakel, Keller, Culver, and the secretary.

Minutes of previous meeting read, amended, and approved.

On motion of M. C. BEEBE, the chair appointed a committee, consisting of Messrs. Beebe, Roland, and Foresman, to receive and report upon the the credentials of newly elected members.

On motion of Professor HAMILTON, the chair appointed a committee consisting of Messrs. Hamilton, Edge, Culver, and Roland to nominate officers for the ensuing year.

The committee upon credentials reported that J. S. Keller, of Schuylkill; R. S. Sterling, of Beaver; W. A. Yeakel, of Montgomery; Andrew Robinson, of Mercer; J. W. Shriner, of Union; Eastburn Reeder, of Bucks; and Thomas J. Edge, of Chester, were properly accredited as members of the Board for the ensuing three years. They also reported that Morgan R. Wise, of Greene, presented a certificate of election, but none to show that his society is entitled to county bounty.

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The committee to nominate officers reported the names of J. P. Wickersham, Colonel James Young, and M. C. Beebe as vice presidents, and that of Thomas J. Edge as secretary. Nominations confirmed by their election, and the committee discharged.

After the presentation of nine names as members of the executive committee, Messrs. Smith and Morris were named as tellers, and a ballot taken, resulting in the choice of Messrs. George and Edge of the members appointed by the Governor, and Messrs. Fahnestock, Engle, D. Wilson, Hamilton, Moore, and Robinson of the members elected by county agricultural societies.

(At a subsequent meeting Mr. Moore was released at his own request, and Mr. Roland substituted.) * * * * * * *

On motion of Professor WICKERSHAM, the time and place of holding the next meeting was referred to the executive committee.

On motion, the President of the Board was authorized and requested to appoint a committee of experts to inquire into and report on the reliability of the Guénon or milk-escutcheon theory for selecting milking stock. Said report to be made to the secretary on or before the 1st of October next.

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Mr. BEEBE offered the following resolution; which was unanimously adopted:

WHEREAS, It is expedient as a matter of economy, as well as for the interests of agriculture in the State, that its agriculture reports should be concentrated into one volume; therefore,

It is hereby resolved, That this Board will, within the purview of the act creating it, cordially coöperate with the State Agricultural Society, State Dairymen's Association, State Fruit Grower's Association, and other similar State organizations in accomplishing this result.

The following communication from the State Agricultural Society was then read, and, after discussion, referred to the executive committee for action:

WHEREAS, The State Board of Agriculture, recently organized in this Commonwealth, by the collection of statistics, and the dissemination of information through its annual reports, promises to become an efficient agent for the promotion of agriculture; and,

Whereas, It has been the practice, and it is the policy and duty of the Pennsylvania State Agricultural Society to encourage and coöperate with every working organization for the advancement of the farmers within the State; therefore,

Be it resolved, That the executive committee, in furtherance of the objects of its appointment, recommend the publication of the reports of the State society, and that the officers of the society be requested to urge the publication of our transactions, and make such arrangements as they may deem best to accomplish that object.

Resolved further, That a committee on publication be appointed to arrange, under agreement with the State Board of Agriculture, the topics to be considered in the annual reports aforesaid, and aid the secretary in collecting and compiling the matter belonging to the report of the society.

At a subsequent meeting of the executive committee of the Board, Messrs. Roland, Engle, and D. Wilson were appointed to confer with the committee contemplated in the foregoing resolution of the State Agricultural Society.

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The President having announced that the reading of essays was next in order, on motion of Mr. KELLER, Professor Hamilton of the Pennsylvania State College, was invited to read an essay on

THE BEST METHODS OF INDUCING FARMERS TO BREED BETTER STOCK.

The opinion prevails amongst farmers that blooded stock, or what they term the "fancy breeds," do not pay. They admire their beauty and perfection of form, and admit that they have certain qualities not found as well developed in the common breeds, yet after all they look upon them as well enough for those who can afford luxuries; but, so far as the ordinary farmer is concerned, they are too expensive and unremunerative. Before much, therefore, can be done in the general introduction of the better breeds of animals throughout the State, the farmers must be brought to believe in them. They must be brought to see that it is bad management to keep a cow that will produce but two pounds of butter a week, when with the same food and attention another would produce eight pounds per week. They must be brought to realize that a horse that can, other things being equal, do twice the work of another, is twice as valuable, that poor stock is a drug in the market, whilst good animals are of ready sale, and that it costs no more to rear the one than the other. They must realize that inferior stock is not only not profitable, but very expensive, and that their interest lies in the rearing of superior rather than inferior animals.

The Pennsylvania farmer is an eminently practical man, and the first question that will be put by him after being urged to stock his farm with the so-called improved breeds is, "will they pay?" He wishes no nonsense in this matter; he is perfectly familiar with the poetry of farm life, and is not affected by glowing descriptions of the effects of a fine herd upon the landscape, nor is he carried away by praises of their symmetry of form, the color of their milk, the fineness of their wool, or the fire in their eye. He is interested in the original question, "do they pay?" There must, to use a technical phrase, "be something in it" before he will be induced to change his present practice. The single fact that it is unremunerative is sufficient to forever condemn it in the eyes of this practical man. To persuade him you must convince him that it pays, and any line of argument or method of teaching that will not show that the improved breeds of stock pay better than the old, will certainly fail of useful results.

This question then resolves itself into this: How can the advantages of the better breeds of stock be shown to farmers? I reply that the most convincing way is through statistics that give accurate and minute information in regard the comparative cost and profit of well and ill-bred stock. This Board might, through its secretary, collect such facts as already exist bearing upon this subject, and also start investigations for the discovery of new evidence of the superiority of good breeds over common stock, publishing these results in such manner as would insure that the farmers of the State would have access to the information conveyed. In order that such information may not mislead, great care should be taken to notice the adaptability of the various breeds to certain localities and for particular purposes, and to give details most specific and particular in regard to the cost of keeping, value of product, longevity of the animal, its uses for purposes other than those for which it is especially bred, together with observations upon its peculiarities of constitution and temperament.

A great deal might be done in the way of encouraging farmers to breed better stock by increasing the amount of the premiums offered for first-class stock by our State and county fairs, requiring that accurate statements be made by the exhibitor, setting forth the points of excellence, cost of keep, worth of product of the animal, together with such other information as might be of interest to farmers. In localities were new breeds are needed, farmers might be induced to club together and purchase one or two animals, at a moderate expense to each individual, and thus accomplish what would have been impossible for one. The agricultural society of the county also might own, with advantage, a number of improved breeds of stock, keeping them at their grounds, and hiring out their service at reduced rates to members of the society. The granges might be induced to invest in a similar manner, and aid very materially the introduction of new and improved breeds throughout the State. In these and many other ways that time would develop, farmers would be brought to see the great superiority of these better animals over their common stock, and as the service became convenient and comparatively cheap, they would gradually become possessed of these better kinds.

It is made no part of the duty of the writer of this paper to exhibit the adantages of well over ill-bred stock; but it is made my duty simply to indicate the methods by which farmers may be induced to adopt these better breeds. In answer to the question given me for discussion—"The best methods of inducing farmers to breed better stock"—I reply: Show by conclusive evidence that they are more profitable than our native animals, and they will universally possess them.

The subject being open for discussion, JOHN P. EDGE, of Chester, said: "Mr. President: The advantage of breeding pure or imporved breeds of stock has been so thoroughly demonstrated in some sections of our country, where they have carried the matter to perfection, that, as I understand, they do not allow any premium to be offered at the county fairs on any male animal not of pure blood. I think I am right in regard to one State, and possibly more."

In Massachusetts, no county society receiving a bounty from the State is allowed to offer a premium for a male not of pure blood.

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The result of the discussion made it evident, as the opinion of the members of the Board, that in Pennsylvania it would not be found to be profitable to raise any but the very best stock, and that a failure to comply with this rule would entail a loss upon the breeder.

Since the reading of this essay, circulars requesting estimates of the cost of a home raised calf, at one, two, and three years, and its value as a cow at the latter age, were sent out to two hundred practical men in various portions of the State. From these reports, from all the counties in the State, it would seem that the *average* estimate of cost at three years old is $34 35, and the *average* value at the same age, $36 86, thus confirming the opinion of the Board, that, except for the best stock, the margin for profit was very small. [SECRETARY.]

The next essay in order was on

THE COMPARATIVE PROFIT OF WELL AND ILL-BRED STOCK.

By WILLIAM G. MOORE, *Member from Berks.*

The subject of my essay, viz: "The comparative cost and profit of well and ill-bred stock," is one requiring considerable thought and research. Unfortunately, I received notice from the secretary, only a few weeks ago, of having been selected to prepare such an essay. In consequence of this short notice, and of my official and private business, it was impossible for me to give this matter that careful preparation which it required.

I have been given quite a large field to roam over, not being limited to any particular species of stock, and will therefore commence my remarks on man's most trusty and useful four-footed friend,

The Horse.

In the section of the State in which I reside, the majority of farmers have for many years raised colts. For a long time, but very little attention, as a general thing, was paid to the breed. All that the farmer appeared to care for, was to raise a certain number of colts each year, with these several objects in view: First, he argued that, by keeping sever › cheap mares for general farm work, he could, by paying a nominal sum say from two to five dollars, procure the service of a common country stallion, of entirely unknown origin; and well do I remember how, when quite a boy, I saw these stallions, gaily bedecked with a broad, fanciful breast girth, to keep the saddle in place, and the foretop and mane, and even, occasionally, the tail, plaited and tied up with red and blue ribbon, and the groom, who was, also, generally the owner, seated on the stallion as proudly as if the animal had been worth several thousand dollars, instead of so many hundreds. One old groom, I remember, always walked and led his stallion.

The next object of the farmer was to get all the work he could out of the mare, working her until within a week or a few days of her time for foaling. After the colt was one or two weeks old, the mare would again be put to work, and thus it was, he considered, that the comparative cost of the colt would be but trifling—never more, at the outside, than ten dollars.

Our farmers, we know, set a high value upon barn-yard manure, and our stock raiser would now reckon that the manure produced by a colt would about half pay for its keep until two years of age. Colts of a large growth are then, at the age of two or three years, hitched up in the manure wagon, or to the plow or harrow the farmer thinking that they are now old enough to earn their feed, or at least part of it. When five years old, the animal has arrived at a marketable age, and then the farmer often finds that out of five animals thus raised, two of them will have but little market value, being either leggy and overgrown, or too small, or having some material blemish. The other three may, ordinarily, command $120 per head, and that is a high average.

In many instances, the farmer will dispose of the most valuable, and retain the blemished or ill-shaped stock to do his work, and, in the course of a few years, will either sell these at low figures—say an average of fifty dollars—or trade with a neighbor, of course, trying to get the best of bargain, or swap with a horse jockey, and get cheated. So that for the five colts thus raised, the farmer may receive the average price of ninety-two dollars.

Now, had a strict account of expenses been kept, it would, no doubt, have been discovered that these animals really cost, at five years of age, no less than an average price of seventy-five dollars. Thus the average profits on the colts per head for five years would be only seventeen dollars. Rather slow business we would think. Even at these low figures, it is hard now to dispose of animals of this class to horse dealers, whilst, at the same time, these very dealers are receiving colts and horses from the western States, which, on account of their superior build, strength, and comeliness, sell readily, even to our farmers, at from $100 to $200 per head.

But our farmers and stock raisers generally are becoming more progressive, and are improving their breeds, and now many Norman and Percheron colts are raised here, and although the services of a well bred stallion may cost twenty-five dollars, the additional cost of raising a colt of this kind will be but very little, if any, more, as they are able to do more work between the ages of three and five years, and though they may, at the latter age, cost an average price of $100, or even $125, yet they will readily command an average of $160, thus leaving more than double the profit of the ill-bred stock, for the farmer will be very apt to have four out of five of well-bred animals of this class to be of good bone, well proportioned, and sound.

Besides this, many of these animals, on account of their size and weight, are salable at four years of age, which is another great advantage to the farmer, as he realizes his profits a year sooner than he otherwise would. I have rated these animals according to the present low market value. A few years ago they commanded far higher prices. There are, of course, some exceptions in this matter of ill-bred stock, as there are to all established rules. I will quote the following:

A farmer in my neighborhood raised six colts, all sound and well shaped, out of a blind, leggy, and very ill shaped mare. But he was careful to have her served invariably by a well-bred stallion, and the progeny taking after the stallion, these good results were thus obtained. I have not been able to learn whether any of the mare's progeny have been used for breeding purposes. If they have been, they will be quite likely to produce, at least, some colts having some of the bad qualities of the blind dam, and thus stock, instead of improving, will deteriorate.

The Mule.

I will say nothing in regard to raising horses for speed, but will now take up the animal of whom it has been said none ever have been known to die a natural death. I, of course, refer to that hybrid whose history and character Josh Billings seems to have studied so carefully for the sole purpose, seemingly, of maliciously slandering it.

There are, comparatively, few of these muchly abused, but inestimably serviceable, animals raised in this State. But a very large number are now used both by farmers and in the larger cities, to say nothing of the many used in the coal regions and by iron manufacturers. The principal reason that so few have been raised here is because our breeders have used miserable, scrawny little jacks, lacking style, shape, and spirit, and bred them to very ordinary mares. As a matter of course, their progeny are small, and although mules are ordinarily marketable at two or three years of age, yet our home raised mules appear so small at that age that they can scarcely be sold at any figure, though, as in the case of horses, western mules of improved breed sell readily here, at the same age, at from $100 to $150. Now, about the only difference in the price of raising a good, large marketable mule would be the first cost of a large and well-bred jack. His services would, necessarily, cost double or triple the price of service charged for the small donkeys now used for breeding, but there would be so much more demand for service as would soon pay the owner for the cost of his jack, and farmers, by breeding to large, well-formed mares, would be able to sell the progeny at two or three years of age at handsome profits, or keep and work them a life time, and then, if they have not been abused, sell them for the cost of raising.

The following brief account of mule breeding and improvement of this stock in Kentucky, the principal mule raising State of this country, may not be out of place:

"Up to the year 1835 the mule was bred solely with an eye to his size and efficiency for heavy drudgery and short fare. He was looked upon in the North as a degraded menial, only fit for the meanest of employments; in the South he was viewed as a necessary substitute for the noble horse, and always consigned to the care of the plantation negro. His breeding was from the diminutive but hardy donkey, common to most parts of Europe, introduced into Kentucky from the New England States and Virginia. The mares employed were the lame, the blind, and superannuated, that were considered unfit to breed colts, and a mule was a mule with a stereotyped value. Twenty dollars at four months was the universal price, and forty-five dollars at two and one half years, when he was driven to the cotton grower. About the year 1835, the first effort was made to improve him by the Honorable Henry Clay, who introduced the Catalonian jack from Spain.

"Spain had been in possession for centuries of a race of jacks distinct from the common donkey introduced into that country by the Moors, and supposed to be of Arabian origin. This jack is entirely different from the common ass or donkey in every respect; of uniform black color; high trotting form; long neck; fine head and muzzle; fine thin skin and fine hair; round chest; high commanding carriage; and the spirit and bearing of the finest blood horse. He is also very uniform in size, varying from fourteen to fifteen hands high. The earlier importers introduced the jack only—an error that the later ones have corrected—the first jennets of the true blood having been introduced about 1853. The result of this introduction of this improved race of asses has had a corresponding effect upon the growth of the mule.

"Instead of the ill-shapen, unsightly, repulsive brute that was grown, there is now the blood-like, high spirited, graceful animal, fit for any service. They are very rich in color, being mostly of a dark shade of bay. Their use has completely revolutionized the trade, breeders selecting the Spanish mule to the rejection of all others, and they sell readily at from $100 to $150, so that even a well bred mule, although costing but little more to raise, will realize nearly double the amount of an ill-bred one."

Cattle.

Turning now to cattle, I would preface my remarks with the oft repeated assertion, that most farmers keep too large a number of cattle. That is, they keep more than they can feed and care for profitably, not giving the proper attention to the selection of animals for breeding. They will not pay a few dollars for the service of a good bull, owned by some progressive breeder, when they can have service from a neighbor's, or perhaps their own ordinary bull, for nothing, when at the same time a calf by the former might be worth several dollars more for veal, or double the amount after arriving at maturity.

Many farmers also raise and keep scrubs for their own use, constantly breeding in and in, and continually retrograding, not thinking that the trouble of keeping a bull is more than all the expenses of the service of a good one. In Kentucky the raising of good stock has become quite a science; cows and bulls sell for thousands of dollars, and the service of bulls is often held at fifty dollars. The result is that good stock has increased so wonderfully, that whereas England was formerly considered the stock nursery of the world, and exported thousands of animals at almost fabulous prices, that country now turns to Kentucky and purchases large quantities of stock, also at high prices.

England imports both for breeding purposes and for food. In 1876, there were exported from the United States live cattle worth $1,110,703. In 1877, the export of live cattle to Great Britan amounted to $546,829. In 1876, Canada imported from the United States cattle worth $164,491. The following clippings from the *Paris True Kentuckian* files of 1876 and 1877, will show that all the cattle exported to England for food, the well bred have brought the high figures:

"Mr. Burns, who has been buying largely of our *best* cattle for Mr. Eastman, who is shipping to England, closes out his business to-day. We are sorry to loose his trade, and hope Mr. Eastman has made it profitable enough to send him among us again. Mr. Burns has been shipping about two hundred and twenty-five head per week, for the last six weeks, and will ship his last lot of about four hundred this week.

"Nineteen cattle, averaging nineteen hundred pounds, were bought in Jessamine county, Kentucky, at nine cents per pound, for shipment alive to London market. Common cattle are bringing only three to three and three fourths cents in Jessamine county.

"The very fine lot of thirty-five Kentucky steers, which averaged fifteen hundred and ninety-six pounds, reached the high mark of twelve and a half cents, to dress fifty-eight pounds. These choice Durhams were purchased by the Samuel Brothers for shipment alive to great Britain."

Of the stock quoted above the well bred sold for two thirds more per pound than common cattle, I have no figures in regard to the cost; but they could certainly not have cost over one third more to raise, and then there would be at least one third more profit in the well bred.

Colonel Jeremiah Weaver, of Berks county, who has fed a large number of cattle and sheep, and who is of the opinion that well-bred stock is by far the most profitable, gives me the following memoranda. He says:

"In 1862, I bought forty-five head of well-bred cattle in northern Ohio. They weighed fourteen hundred and forty pounds per head. I walked them four hundred and fifty miles; commenced to feed them at home, November 21; fed fifty bushels of corn per head; sold them in Philadelphia, May 14, 1863, each bullock having gained an average of four hundred and eighteen pounds.

"Two years after that I fed forty-five head of ill bred cattle, whose weight averaged nine hundred pounds; fed from November until May. They gained only one hundred and twenty-three pounds.

"About the same time I bought a well bred cow for which I paid $100; raised out of her four calves; one bull when four years old, weighed dressed, fourteen hundred and eighty-eight pounds; one cow with her third calf sold for $85; one at $90; one excellent milker I still own; and the cow after being fattened brought me $97 50. At the same time the common breed of cows were selling at from $30 to $60."

Jacob G. Zerr, President of the Berks County Horticultural and Agricultural Society, and a progressive farmer, says:

"I consider that it costs no more to raise good than ill-bred stock. A well-bred foal is worth from $20 to $100 more than one of the inferior blood. The comparative cost of raising is the same until three years of age, when the difference in value of the two might vary from $100 to $1,000, in favor of the well-bred colt.

"A good blooded calf when first dropped is valued by stock raisers at form $10 to $100. A common calf at the same period at from $3 to $10. The cost of raising the first year is about $10. Second year about $12. Third year $15. Cost of well bred at three years $47; ill bred $40. So that the former would cost about $7 more, it would probably sell at from $75 to $100, while ill bred would not bring more than cost of raising, which would make quite a contrast; certainly not in favor of ill breds.

"As to pigs. Pure blooded shoats at four weeks old will bring $10 per pair, while ill bred of the same age will bring form $3 to $5 per pair. Any farmer after once using a well bred boar, and feeding his stock liberally, will be convinced that he can produce better pork, and at considerable less expense than he could in the use of the common boar."

Mr. Zerr being a breeder and dealer in Berkshires, thinks that breed the best, being hardy, thriving fast, growing large, and laying on fat with more streaks of lean meat running through the fat, and meat has a better and finer flavor than any other hog raised.

Of sheep, he says, pure blooded sheep will give a still better return for money invested than ill breds, as they have better and finer wool, worth more per pound in the market. and stock will increase faster in number, often doubling and tripling, and are worth more in the shambles than ill breds.

And now, in conclusion, I can only say that want of time alone prevented me from furnishing more figures to prove what I firmly believe, and that is, that well bred stock, although costing more originally, will in the end be far more profitable to the raiser than ill bred.

As a further proof of the good results of raising good stock, the secretary offered the following, furnished by a western correspondent, and, of course, dealing with the question from a western stand point; with proper allowance for the difference in situation, the same argument may be used here.

1. Live weight of a Short-Horn, at two years old, fourteen hundred pounds.
2. Gain, first year, eight hundred pounds; second year, six hundred pounds.
3. Give the entire milk of the dam six months, and grain the remainder of the year.
4. Cannot attain as good results by feeding skimmed milk, nor even by hand feeding, counting labor.
5. Would consume ten bushels of corn the first year, and eight hundred pounds of hay; the second year, twenty bushels of corn, and two thousand pounds of hay.

Value of feed first year.—Milk $18; grain, $2 50; hay, $2; total, $22 50. Second year,—Grain, $5; hay, $5; pasture, $6; total, $16. Total cost for two years, $38 50.

Manure and cost of marketing the grain, are equal to the care.

Value of steer, at two years, fourteen hundred pounds of beef, at five cents, $70. Deducting $38 50, cost of production, we have profit $31 50.

Short-Horn at Four Years Old.

Corn for two years, eighty bushels,	$20 00
Hay for two years, three tons,	15 00
Pasture for two years,	12 00
Interest and taxes on $70—value at two years,	17 00
	$64 00
Cost at two years,	38 50
Total cost at four years,	$102 50

Value at four years, weight nineteen hundred pounds, at six and a quarter cents,	$118 75
Total cost for four years,	102 50
Net profit, if sold at four years old,	$16 25

Scrub Steer at Two Years Old.

Treated in the same way, the scrub will make, the first year, six hundred pounds; the second, four hundred pounds.

Total weight for two years, one thousand pounds, worth, at four cents,	$40 00
Cost same as Short-Horn,	38 50
Net profit,	$1 50

Scrub Steer at Four Years Old.

Cost of production same as Short-Horn,	$102 50
Weight at four years, fourteen hundred pounds, at five cents,	70 00
Loss if kept till four years old,	$32 50

Profit of Short-Horn over scrub, at two years old,	$30 00
At four years old,	48 75

Important Deductions.

1. It costs much less to make a pound of beef the second year than the first, because it is made upon cheaper food.

2. The profit of selling a Short-Horn at two years old is double that at four years.

3. Feeding and turning Short-Horns at two years old, will make the corn fed net over $1 25 per bushel, and they are turned nearly as soon as hogs.

4. If instead of keeping the same animal to four years old, it should be sold, and another reared, the account would stand:

Profit in four years, by selling at two years old,	$63 00
By selling at four years old,	16 25
Gain by selling at two years,	$46 75

5. The above statement is unjust to Short-Horns on the four-year-old exhibit, because they could be made to weigh nearly the same amount at three years old, which would make the account at three years old show a profit of $48 25. For the sake of comparison, the estimate of the Short-Horns is carried to four years old, the age of the maturity of scrub steers, while the Short-Horns, with their characteristic quick growth, mature as well at three years as the scrub at four.

The paper being open for discussion,

Mr. Fahnestock, of Adams. In our county the subject of pure bred cattle has not attracted as much attention as in some other counties in the State, and, therefore, I do not feel like touching upon the question, at any length. In fact, I am not fully competent to discuss this question, for the reason that I have given; but there are a number of gentlemen here who should be heard from, and I trust they will embrace this opportunity. The gentlemen who write these essays, will think that they fall pretty flat, if we try to pick no flaws in them, or give no encouragement to what they have done. These gentlemen certainly have gone to a great amount of trouble, and I hope others will give their views on what has been presented in these papers.

Mr. W. S. Roland, of York. I have been very much gratified with the reports that have been made; but as I am not a stock-raiser now, (and never was a very extensive one,) I would sooner have others discuss the question. If there are no members of the Board who feel disposed to speak, I think an invitation might be extended to gentlemen present who are not members.

The motion was made and agreed to.

Mr. J. C. **MORRIS**, of Susquehanna. Speaking of fine stock, I have been raising Short-Horns for a number of years. The difference in different breed is, of course, very great. We have an importation from England of two distinct stocks, one called the Dutchess, and the other the Princess, The Dutchess is what we call our milking stock; and the first importation that I remember of was by a man named Hollis, near Cherry Valley, in the State of New York. They are a fine milking stock, and their offspring are much sought after for that purpose. They are also fine butter makers, the quality of the butter being excellent.

Then we have what is called the "Booth" stock, which we get from the West. They are the beef cattle, and are the ones that are exported to England.

One gentleman spoke of sheep. There is a difference between the fine and the coarse wool. The fine wool can be kept in very large flocks, and they are so raised in the northern portion of the state of New York. The coarse wool require more care, and very few can be kept together. Flocks of twenty-five or thirty, say, are quite large enough. Large flocks become diseased. But the fine wool can be raised in flocks of one and two hundred without difficulty. I have bred sheep as far back as I can remember, and have taken the coarse wool in Pennsylvania, because I could make no sales of the finer at remunerative prices—that is in our portion of Pennsylvania.

Mr. M. C. **BEEBE**, of Venango. Would the gentleman consider it profitable for ordinary farmers, with ordinary means, and with the usual facilities for keeping stock, to embark practically in the stock-raising business?

Mr. **MORRIS**. I would, so far as the Dutchess and Princess breeds of short-horns are concerned. Of course you cannot import fine Short-Horns for a small price, but you can go to breeders in this country, and get for from ten dollars to twenty-five dollars just as good an animal as one would probably wish to start with.

Mr. **BEEBE**. For ordinary purposes, say for butter, would ordinary cows, properly kept, be equally as good as thorough-breds?

Mr. **MORRIS**. Yes, sir; thorough-breds are no better. If I were going to start a dairy for myself, I would pick out good milking cows—taking the mothers, and picking out the calves with just the same certainty. I can go into any man's herd, I believe, and pick out his best cows. I have done it I suppose hundreds of times. I have seen this thing commented upon in the agricultural papers, to the effect that it is a humbug but I know that it is a fact, that with certain points borne in mind, you can pick out the best cows and the best calves.

Mr. **BEEBE**. Are you guided by the Guenon theory?

Mr. **MORRIS**. Not the whole of it. Any man who is a judge of cows can go into a drove, and taking a cow from the head back can, with the right points, pick the best one out.

Mr. **EDGE**, (the secretary.) Could Mr. Morris go among a number of dairy cows, all covered except certain parts, and tell the best animals? *

Mr. **MORRIS**. You may cover a cow, all but the tail and back part of her. I have gone through a stable and picked out six, and kept whittling down to one, and said: "Gentlemen, that is the cow," and done that several times. I have had experience in breeding cattle ever since I was eight years of age, but it has ruined me for anything else. I was intended for something else when six years old; but going to a sale with an uncle—I rode with him in the sulky. While he was buying, or while these cattle were being sold, I walked around the yard and saw a bright yearling, or two-year old. I bought her at the sale for eighty dollars. When I came around holding my uncle's hand, he said: "Johnny, you have bought that heifer; who is going to pay for her?" I looked up into his face very calmly, and said "You!" He said "The devil I am!" but he gave his check and sent her home. That is what made me a farmer. I have had cows, and good cows, ever since.

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*The Guenon commission (appointed by the Governor) have since been submitted to this test. The cows were carefully blanketed, so that the Guenon marks alone were visible. The result of this test is fully set forth in the report of the commission, and confirms the opinion of Mr. Morris.

Mr. BEEBE. Could you not give us the good points of a good cow?

Mr. MORRIS. I would commence with her muzzle; give her a long, thin, fine head, with a fine, clear eye, with a fine, clear horn, with a low fore-shoulder, with a heavy heart—because there is where the machinery is at work, for she is nothing anywhere but machinery—and then run back with a broad hip. I do not care whether the bones on the side of her tail are droopy or not. Then with the average milk-bag, and large vein, you are very sure of having a good cow, if well kept up. You do not need to look as you look for beef. When you look for beef, you want to get a strong head and good veins, the whole running well through the body. You will find that a poor milker has very small veins. A large milker has very large veins. The veins are large, running back. That is one point. The color of her skin indicates very much the richness of the milk. Guenon, I do not think, says anything about the richness of milk in the cow. It is the amount of milk she gives. I use the Durham cows for milk.

As to the quantity of milk, if you feed your cows on hay alone, and you have a lazy fellow for the winter to take care of them, he will dry them up quick enough. I believe it depends upon the man who does the milking. I believe there is one grade of Short-Horns which can be milked until they are about ready to come in again. I do not say there is no difference in the different bloods. The Booth blood are no milkers at all. They are very much like a horn for dryness. When I first came into the State of Pennsylvania from the State of New York, I came down to the Wyoming fair, and bought some Booth heifers, (not knowing exactly what they were for milking,) and took them into Susquehanna county. They were very large, very beautiful in appearance; the heifers having fine heads and faces, and all alike. After their arrival home I went down into the field, singled out a three-year old heifer, but found she was of no service for milking, for she did not give as much milk as many a sheep would. I then fattened them up and shipped them out of the State. I then bought Short-Horns.

Mr EDGE, (the secretary.) Has the gentleman ever paid much attention to the Guenon theory, as applied to fattening cattle?

Mr. MORRIS. No, sir; that is a thing I have yet to look up.

Mr. EDGE, (the secretary.) While I do not pretend to fully understand the theory, yet I have given it some attention for years. When in the dairy business, I noticed that a good butter cow was (when dried off for beef) a good feeder. It had been assumed that the milk was but fat turned into another channel, and hence I adopted the theory that the system, if good when applied to cows for milk, should be equally good when applied to feeding cattle. My observation has convinced me that this theory is correct, and I am glad to know that the experience of Mr. Blight (president of the Guenon commission) and that of Colonel Young fully support the theory.

Mr. KELLER, (of Schuylkill.) Are there two kinds of Short-Horn cattle, one for milk, and one for beef?

Mr. MORRIS. Yes, sir. There are three different kinds that I am certain of; but two of them are good for milk, as far as I have had them. I believe that any thorough-bred can be made to do very well; but for myself I would get a fine, Short-Horn bull, from good milking stock, and then cross on to anything, and I would improve it.

It is exactly so with Devons. They are beautiful. But the only thing is their size. I think, though, as far as I have seen them, that they are as fine cattle for fattening as any you have. Although the Devons are not considered good dairy cows, they are good cows, but not good for cheese. They are good for butter. We have as fine Devons in Susquehanna county as there are in the United States. They are just as well bred. We have a great many of them. Of course, proper care, even with the Devon or Short-Horns, will increase the milk. But they cannot make the amount of cheese that is made from some other breeds.

Mr. J. S. KELLER, (of Schuylkill.) I would like to hear an explanation given of the kinds of cattle from those different islands—one is called the Guernsey, one the Alderney, and one the Jersey. Are they one or different breeds?

Mr. MORRIS. They are the same, although from different islands. I have bought Jerseys and Guernseys both, but they were playthings. My wife wanted a Jersey cow, and I got one; and from that experience I say this.

Mr. JAMES YOUNG, (of Dauphin county.) I have had them, and I have had the Durhams; and I can say of the Jerseys that they are the best cows. My experience has been that there is a difference in cattle, even of the same breed. One cow will give a large flow of milk, and another of the same breed a small flow. I cannot agree with the gentleman as to the Durhams, and consequently I now have the Jerseys. With me they are great milkers. All I have got are thorough-bred cattle, and in connection with them I have a dairy.

As to selection, I agree with the gentleman. I can go into the stable and pick out the best milkers without a great deal of trouble. But with all breeds you will find some giving a very large flow of milk, and some a very small quantity. I think if my friend will give the Jerseys a thorough trial, he will find them the best. I have a couple of Durhams now. Then I have one which is not a thorough-bred, but a cross, that beats them all in quantity, having repeatedly given "a bushel" of milk a day.

I believe it applies to steers as well as to milkers. I have gone through the stables, and I find the same rule applies.

If you make the same test with Short-Horns or Devons that you do with Jerseys, they are no milkers at all. They are fine feeders. I have the two kinds in the stable now; but when it comes to Jerseys, I will not back down on them.

Mr. MORRIS. A few years after I came into this, my adopted State, I came to this State capital to attend a fair. While here, I looked at the stock, and saw but two fine animals; two which I would have taken as a gift. The others I would not have taken home. The two heifers that I saw belonged to a man by the name of Young, who lived then down towards Lancaster. They were the only two really fine animals there. The balance of the stock was bad; in other words, mighty poor.

Mr. YOUNG. I live within nine miles of this place, east; and I have some forty head of cows there. I would be much pleased to have the gentleman come down there. I am satisfied he could learn me. But as to the milking qualities of the Jersey, I think I can convince him, not only as to quality, but quantity.

Mr. BEEBE. Is not the Ayrshire a better cow?

Mr. MORRIS. No, sir; I would not give a three pence for any of them. The Holstein is a good cross, but she is not fancy enough for me. I want something fancy, as well as good.

Mr. JAMES YOUNG, of Dauphin. I have bred these Jersey cattle until I have got to believe that the man who has a drove of them is well off. When I first brought them home my sister, who has charge of the milking department, would not have anything to do with them. I asked her to try them. Now she is a warm friend of the Jerseys. Jersey cows are little, but they are good. Some of the number that I have give milk so freely that they ought to be milked three times a day.

Prof. J. HAMILTON, of Centre. Will they continue to give milk in this way?

Mr. YOUNG. A No 1 milker will wear out like a good machine.

Prof. HAMILTON. What do you do with them then?

Mr. YOUNG. Some I kill and some I sell.

Mr. MORRIS. I suppose the gentleman has reference to their disposal for beef?

Prof HAMILTON. How do you get your money out of them?

Mr. MORRIS. You get your money out of them in the first place. One cow gives eight pounds a week and another ten pounds. You can milk a cow from three years until eleven. But say there is only two pounds difference a week. Estimate, and you can readily see the profit in keeping a good cow. You could give her away at the end of her usefulness and make money out of the entire transaction.

Mr. YOUNG. The same rule will apply to a good horse. Take a twelve or fifteen-year old mare, what do you do with her?

Prof. D. WILSON, of Juniata county. Are they more remarkable for quantity than quality?

Mr. MORRIS. Quantity.

Prof. WILSON. What seems to be the average quantity of milk?

Mr. MORRIS. I would not keep a cow, unless she gave twenty to twenty-four quarts a day; that is in season, running along up to the time that cows dry up—you might say in July. Then let the amount dwindle off, until she gave ten to twelve quarts.

A MEMBER. How much in the month of March?

Mr. MORRIS. Just as much as you feed her. Set the machine to work, and she will give in proportion to the feed given her.

Mr. YOUNG. It will take one third more to keep a Short-Horn cow than to keep a Jersey. I have had them both. The Short-Horns are great big animals, and will weigh enormously; but when placed side by side with the Jersey, the difference in keeping is very marked. Take two horses, you will often get as much out of a small one as a larger of the same species.

Mr. MORRIS. I do not undertake to say that the Short-Horn cow will make more butter.

Mr. YOUNG. You know that some cows will start off with a great flow of milk, and then they will dry up. I will say that when it comes to beef, then I prefer the Short-Horn, and I am feeding a large number of them now; but when I want milk, and to keep the cows in the most economical manner for the quantity received, give me the Jerseys.

Mr. **Morris**. With us, we are for both butter and cheese, and the quantity of milk is also a consideration.

Mr. M. C. **Beebe**, of Venango. This discussion seems to have been confined entirely to the Durham and the Jersey, or Alderney, and their relative merits. I am not disposed to leave this subject without saying a word for the Ayrshire. In doing so, I shall be brief. In giving the relative merits, I will start out by saying Durham for beef, the Jersey for butter, the Ayrshire for cheese. They may bring either their Durham or their Jersey, and, so far as my information goes, the Ayrshire will exceed them in quantity. For several years I have bred more or less of the Ayrshire. I sent to New York to a farmer, and got an imported bull, one I believed to have been of good stock. In the first test of the first year, the returns were so insignificant that I was sick of the bargain myself, along with some of my neighbors; but some I raised, and some they raised, and we found, as soon as they commenced to be milkers, that we had a valuable animal, both for milk and for easy keeping. They are a very hardy animal. I venture to assert that if you take a Jersey and an Ayrshire cow, side by side, to winter, putting them down to the same quantity of hay, and with a pint or a quart of meal each at a feed, that the Ayrshire will show the best in the spring. So that for mountainous countries, as well as in very rich land, the Ayrshires are well adapted to raising, and they are not so subject to disease as other breeds. Compared with the great Durhams they may not appear to be half the size; but they eat scarcely more than one half the feed, and they will give the same quantity of milk right along for the first four or five months, and perhaps more. About the 1st of December, when the Durhams are dry, you can continue to milk the Ayrshire. One is scarcely able to dry them up by any process, except six weeks prior to their coming in. Hence, to farmers I would have no hesitation in saying that for cheese the Ayrshires are the better breed of cattle.

Mr. J. S. **Keller**, of Schuylkill county. I have some grades of cattle of the Channel Island breed. I find they do not give as much milk as some other breeds; but their milk is rich. The butter is yellow and delicious, and they are equal in that respect to any other breed.

Mr. H. M. **Engle**, of Lancaster county. The reason why the farmers of Pennsylvania do not have better cattle is they do not take sufficient care of their stock. The idea of Professor Hamilton, in his paper, is to educate the farmers up to the idea that it pays better to have good than poor stock, but they must take proper care of their stock before they will get better. In regard to bettering stock, there has been, and always will be, a conflict of opinions. Those in the Short-Horn business will defend and set forth their preferences for Short-Horns. For it is a matter of money with them; and Short-Horns and money, in this respect, are one and the same thing.

There are different grades of Short-Horns, and it is not strange that a want of this knowledge has led to various prejudices. Certain kinds have been bred for beef purposes, whilst others have been bred for milking purposes. So long as Short-Horn breeders will breed for butter and milk, and will make the best selections to improve, they will have just as good milk and better cows eventually; but this will require some time. There are those who breed for beef altogether, and many breed for milking qualities altogether. The question is asked what is a thoroughbred? What I understand it to be is a certain breed of cattle that have been bred for a number of generations until they become a fixed type. I have no doubt that Short-Horns and Jerseys and Ayrshires at one time were ordinary cattle. They were bred for certain purposes, and it would require quite a number of years to breed out a certain kind. Take, for instance, our own stock—probably just as good as any of the dairy breeds—and you breed a cow with the best thoroughbreds, it may be a poor milker. They become a regular strain of milkers, and will not easily dry up. This is the advantage of always having thoroughbred animals to keep up a certain type. It is admitted that other great animals are just as good for milking and the dairy as thoroughbred, but breed from grades for generations, it will breed out. This is an advantage of thoroughbreds of a fixed type for holding it. One type of the Short-Horn for beef and the other for butter. Mr. Young's Jerseys are pretty hard to beat, I should judge. He has a number of excellent "play things" worth from four hundred to one thousand dollars each.

In reference to milk and butter qualities, I believe that it is conceded that the Guernseys and Alderney, or Jerseys—different strains, although somewhat similiar—invariably make the most butter. If I am not mistaken, they make all the gilt-edged butter, which is generally sold in market at fifty cents to a dollar a pound. Not a great deal of that butter is made from the common class of cows. As a rule, Short-Horn cows will not make the quantity of butter that Jersey cows of a good strain will. Jerseys have different strains; some bred for milk and butter, others for fancy. Others get their stock a little more plump than lean, and physically run it down; but it is claimed of the Jerseys, and I think correctly so, that they will make more butter from a given amount of feed than any other breed of cows now known. Farmers ought to look to the getting of the largest amount of product from a given amount of feed, and that, I think, the Jersey will do. The Ayrshires I am not much acquainted with. I think, however, that the remarks of Mr. Beebe are correct, that they become large milkers, and that the article is rich. They are valuable no doubt.

Mr. **Morris**, of Susquehanna county. The first five months of a calf's life is all there is of it. The calf is made the first five months. The general practice through the country, after the calf becomes one or two months old, is to turn it out, and there let it fight the flies the whole season. The farmer is very busy. He may come in late at night. We work out as long as the sun will let us, and when we get through, the men are tired, and the calf is forgotten and stunted; and after it is stunted, what does it ever amount to? Never turn your calf out the first year. Keep it in the stable. Then you will have to take care of it, and then you will find the animal growing satisfactorily; and instead of a little yearling, you will have a big, fine two-year old. A man came into my yard not long ago from Schuylkill county, and asked what I would take for a certain animal there. I said I would take so much; "there is the pedigree." He thought the animals were two-year olds; but they were yearlings. They had never seen grass; but were fed on milk and grain until the winter came. Through the winter season they were hardly fed with grain at all; but on hay.

Colonel **Young**. Mr. Morris has covered the point exactly. If the calf is turned out the first summer to fight the flies and get its living as best it can, it will be stunted right at the start, and will never recover the lost time. Instead of turning it out in pasture, put it in a stable not too light, and feed regularly, and it will pay well. If this was the universal practice, we should have less of *little* Jerseys or little stock of any breed. If you must starve them, it had better be the second summer. But better keep them growing all the time.

The **Secretary**. Mr. President, the discussion has taken a wider range than is warranted by the essay of Mr. Moore. Some very good practical ideas have been drawn out from men who are noted more for their works than words. The question of the comparative merits of different breeds as milk cows is one of the many which this Board can hardly hope to settle. If Mr. Morris will visit Colonel Young's herd of Jerseys, I will guarantee him the best of treatment during his stay, and know that before he leaves, he will have formed a much higher idea of the ability of the Jersey as a dairy cow. In the production and selection of his herd, the colonel has had a view to business; and while good colors and points are not entirely lost sight of, they have not been made the *main* item to the exclusion of the milking properties. For practical business, as either a milk or butter dairy, I know of but few better in the State, and when the claim for quantity of milk (not a leading point in the Jersey) is the question, I will place them second to none. Mr. Young and Mr. Keller, probably both, committed one and the same error when they condemn the Short-Horns and the Jerseys from their personal experience with a few animals. It is only by the aggregate of individuals that the race can be fairly judged; and by this test, the Jerseys carry off the palm for quantity and quality of butter, and the Short-Horns for size of carcass, early maturity, and quality of beef. Colonel Young, however, has thoroughbred Jerseys, which, when fat, will push Mr. Morris' Devons pretty hard for both quality and weight.

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Discussion closed, and on motion of Mr. FAHNESTOCK, adjourned to meet in the House of Representatives, at half past seven, P. M., for the purpose of hearing an address from Prof. J. P. Lesley, State geologist and geogeologist of the Board.

At an adjourned meeting of the Pennsylvania Board of Agriculture, held in the hall of the House of Representatives, Wednesday, January 23, 1878, at half past seven, P. M.

His Excellency the Governor in the chair. Minutes of previous meeting read and approved.

His Excellency the Governor said:

We have present with us to-night, a distinguished gentleman, a citizen of Pennsylvania, who is thoroughly familiar with the geology of this State, who has been invited by this Board to address you this evening upon the subject of soils, as regarded from the side of geology. I need say nothing more than simply to introduce to you Professor Lesley, of Philadelphia. [Applause.]

Prof. Lesley then addressed the meeting as follows:

THE BEARINGS WHICH A GEOLOGICAL SURVEY HAS UPON THE AGRIRICULTURAL INTERESTS OF THE STATE.

Mr. PRESIDENT AND GENTLEMEN: I have been requested by the Board of Agriculture to address you on the subject of soils, and, of course, I can only do this as a geologist. It is a subject pertaining more properly, as everybody knows, to the agricultural chemist. I must beg your indulgence, therefore, if in obeying this call from the Board of Agriculture, I shall have to treat the subject differently from what I should do if I obeyed simply a call from the board of commissioners of the geological survey.

The science of geology touches the art of agriculture at only three points:

1. In its explanations of the origin of soils from the mother rocks.
2. In its descriptions of the orderly or disorderly arrangement of soils on the underlying rocks; and
3. In its discoveries of the elementary or chemical constituents of rock, sub-soil and soil required by plants.

Whatever knowledge geology has on these points it offers to the farming population of the State, and thereby performs one of its duties to the Commonwealth.

It is needless to speak of its other duties. Everybody comprehends by this time that coal mining and iron smelting depend for their success as much upon geological information as upon practical experience. Even when *professional* geologists are not employed, all superintendents of mines and furnaces become theoretical geologists in spite of themselves. Even in a hap-hazard business, like boring for oil, geology has become a necessity, and is habitually practiced by thousands of people, who, were they questioned on the subject, would say that they know nothing about geology at all.

In fact, geological science has diffused its principles, and even its methods, throughout the entire population of Pennsylvania; in rather a vague and indefinite manner, it is true, but really and truly for all that. All that is needed is a few more years, and then everybody will have a sufficient practical knowledge of where our beds of coal, belts of iron ore, horizons of petroleum, streaks of pure limestone, deposits of glass sand, potter's clay, and best building stone are to be looked for, and how they can be followed up.

But it will be a long time before our farmers shall all understand that the same sort of science is of use to them; before they will believe that even the best geologist or agricultural chemist can teach *them* what they have not already taught themselves by long practice and hard experience on their own farms. And yet not one farmer in ten thousand could answer the simple question: What *is* soil? And yet, to the farmer, soil is the most important thing in the world. His business is in it. His life comes out of it. His home is on it. He turns it over and over to find money; and with the money thus found he buys the necessaries of life, the luxuries of modern civilization, instruction for his children, civil, religious, and political liberty for himself.

If his share of soil be good, he can grow wealthy and powerful, and make his descendants great in the land. If his soil be poor, he must live and die an overworked, discouraged, and defeated human being; his children will be scattered, and his name forgotten.

Regions of good soil are sure to become populous and potent centers of human activity. Mills multiply in them, and their streams are made to store up and give out power. Woolen-mills are built beside the grist-mills. Turnpike roads and then railways are constructed to take away the products of the soil and bring back coal. Coal supplants water power, and capital from a distance flows in. Surplus wealth seeks employment, and iron works are erected. Iron ores are demanded, sought for, found, mined, and smelted. Rolling-mills are attached to the iron furnaces; nail mills, machine shops, agricultural instrument factories follow; then cotton-mills, chemical works, and a hundred other forms of organized energy transfigure the fertile district, and it becomes a little kingdom in itself, sufficient unto itself in peace and in war, and able to dispense blessings to distant lands.

It feeds, protects, works for, legislates for, and enlightens the people of the poorer unfertile forest-covered districts all around it. It breeds governors for the State, bankers for the exchange, merchants for commerce, mechanics for trade, scholars for science, orators for religion.

In the soil, then, the whole human world is rooted. Good soil has always been essential to civilization. The best soil is that of river deltas; and on these have sprung up all the mighty empires of history. On these are built all the greatest and wealthiest cities of the world.

The next best soil is that which covers the limestone rocks. Where continents are crossed by belts of limestone soil population is dense and intelligent, and the map is studded with villages and large towns. France became the most powerful and enlightened country of continental Europe because one third of its area is an unbroken plain of limestone, with Paris in the center; and another third of its area consists of an almost unbroken delta deposit, stretching from Marseilles to Bordeaux. At first there was a double France. When its northern and southern halves were united under one government, then, united France dominated Europe.

Our western prairies have virtually a delta soil, and the men of the prairie are becoming the rulers of the Republic. Southern Russia is floored with the same black earth, of apparently the same age, and of similar origin. We may safely predict that southern Russia is destined to rule the eastern world.

Northern India is one immense delta, and on this unbroken plain have lived a succession of empires. At present it supports a population three times as great as that of France.

North-eastern China is an immense delta, and its rulers have firmly held their power for four centuries over all the other provinces of the Empire.

The first men lived in the forest, and preferred the hills, because the denser and more luxuriant natural vegetation of the low rich soils defied their feeble efforts to subdue it. But as mankind improved in arms and arts men descended from the mountains to the plains, from the heads of the rivers to the deltas at their mouths, and built cities and ships. The successive erection of city after city along the Ganges, each new one lower down the stream than the one preceding it, shows the steps of the process.

After the deltas had been reclaimed and populated the uplands and interior were re-occupied. Poorer soils were cultivated and exhausted. Men migrated to fresh lands and exhausted them in turn. Manures were discovered. Mineral fertilizers come now into use; lime is burnt; potash and gypsum are mined. All kinds of soil, even the poorest, can now be permanently occupied; populations need not be crowded into the most fertile geological belts; railways and good roads sow fertility everywhere; and the democratic principle of the greatest good to the greatest number, and more good for all, may be realized.

Geology teaches us that the goodness of a soil depends upon two facts: 1. The variety of its elements, and, 2. Their looseness. This is illustrated best by the fertility of the delta soil of the great rivers of the world, which have their rise in distant mountain ranges, and receive, on their way to the ocean, the various drainage of many regions, all differing in their geological formation.

1. The plain of the Po has been made out of the slow destruction of the granites, limestones, dolomites, and clay slates of the Alps and Appenines. Holland has been reclaimed from the North Sea by the Rhine bringing the commingled sand, clay, and limestone mud of the Alps, the Jura, the Black Forest, the Vosges, and the Taunus; the débris of formations of all ages. The lava beds of Abyssinia, the red sandstones of Ethiopia, the sienite of Nubia, and the nummulite limestone of Egypt have been washed down piecemeal to constitute the delta of the Nile. The delta

of the Amazon represents the waste of half the Andes. The delta of the Mississippi is a newly created world of every kind of mineral stuff; some of it brought from the coal measures of Pennsylvania and Virginia; some of it from the devonian and silurian sandstones, slates, and limestone strata of Ohio, Indiana, Kentucky, and Tennessee; some of it from the granite hills, the iron ore beds, the copper traps, the huronian jasper rocks of Wisconsin and Minnesota; some of it from the great flat outspreads of cretaceous sands and clays of Arkansas, Kansas, Idaho, and Montana; some of it from the lignite and clay beds of the bad lands of the Missouri and its branches; some of it from the trias, carboniferous, devonian, and silurian formations, the tertiary parks, the granite cañons, the trap dykes and gold veins of Colorado; and some of it from the most recent of all the formations, the northern drift, carried from the mountains of upper and lower Canada by ice, resting for a time on the northern belt of the United States, and afterwards swept, grain by grain, down to New Orleans.

The soil of Louisiana may, therefore, be truly said to represent the entire geology of North America, being a mixture of all known rocks reduced to a fine sand, loam, or mud. Hence its fertility.

The Susquehanna river is forming a delta in Chesapeake bay; and if this delta be ever lifted out of water by a slight rise of the continent, or a slight fall of the ocean, it will be fertile with all the elementary minerals translated from the coal measures, both anthracite and bituminous; the red shale of Catawissa and Trough valleys; the white and red sand washed from the flanks of all our mountains from the North or Kittatanny to the Bald Eagle and Allegheny mountains; the grey and olive Chemung and Portage sands and clays from the State of New York; the red shale of the Buffalo, White Deer, Stone, and Frankstown valleys where they mine the fossil ore; slate and limestone mud from the Nittany, Kishicoquilis, Cumberland, and Lancaster valleys; micaceous mud from the South mountains, and the plain of York county, and the red sand and clay of the trias belt in Lancaster, York, and Adams counties.

In this way all the varieties of soil are mixed together to make a delta soil. All the alkalies and all the metals are present. Silica is abundant in the pure form of minutely broken crystals and rounded grains. The silicates of alumina, lime, potash, magnesia, and soda are present as equally minute fragments or rounded grains of the mother rock. The carbonates of lime, magnesia, and iron, present in the same form; grains of gold, of silicate of zinc, of sulphide of iron, of sulphide of copper, of hornblende, of tourmaline; flakes of mica; grains of magnetic and titanic iron and brown and red hematite; myriads of microscopic fragments of shells, corals, fossil fish-bones and coal—make up the motley crowd.

Of course every plant that can bear the summer's heat or winter's cold of Pennsylvania, at the sea level, would find its *mineral* sustenance and stimulus in such a soil, and without working hard for it.

2. This is the second point, and one as important as the first. Not only are all the mineral elements there—not only are they all there in boundless profusion and unlimited plenty—they are there so thoroughly mixed and so loosely compacted that the indolence of the most feeble plant finds no excuse for going hungry; and they are mixed to such a depth that innumerable generations of plants cannot find bottom to this treasury of vegetable life.

The finest soil will remain barren, however, without moisture, and famines have occurred in India for lack of rain. In Egypt, where rain seldom falls, the periodical inundations of the Nile answer the purpose of rain. Each spreads a thin layer of fresh compound over the surface. During the dry months of the year a thin layer of calcareous sand blown from the desert is laid down. The delta is thus composed of alternate layers of lime, sand, and mud, which are mixed together by means of the plow and the hoe. The naturally rich soil receives from the hand of nature every year a top dressing of lime. These alternations have been bored through by scientific explorers to a depth of seventy feet, and the evidences of man's occupation of the surface have been found at all depths. Calculations of the rate of the deposit make it probable that the lowest layers reached in the borings were deposited seventeen thousand years ago. Man was even then rejoicing in a bounteous fertility of soil annually manured with lime by the river and the winds. This accounts for the fact that the Egyptian civilization preceded all others, and that the Roman Empire depended upon Egypt as its granary from century to century.

3. It is needless to pursue the foregoing train of thought to bring into strong relief another point, viz: the contrast between the soils of uplands and lowlands. This contrast can stated in a few words.

Lowland soils, especially the soils of river bottoms, resemble delta soils in the variety of their mineral elements, in the looseness with which they lie together, and in the natural manuring to which they are subjected in years of unusually high water. Rich in their origin, their fertility is restored and enhanced by every disastrous flood. Patches may be ruined by the local deposit of bowlders and gravel; but the whole is improved for the use of man. Parts may be washed away; but the stuff removed from the river bank higher up manures the surface lower down the valley.

Highland soil is just the reverse of all this. Its origin is not from a distance; but on the spot. The soil of a hill-side is a decomposition, or rather disintegration, of the rocks of the hill itself. The whole surface of the earth is mouldering. Every outcropping rock, whether hard or soft, granite, gneiss, greenstone, serpentine, mica slate, conglomerate, sandstone, clay, shale, coal, iron ore, limestone, is slowly but surely turning into soil under the influence of sunshine and frost. Heat expands it; cold contracts and cracks it; rain pervades it; frost pushes the particles asunder, and makes room for vegetable fibers, which widen and deapen the fissures. Carbonic acid in the rain dissolves the crystals and rock grains, and thus each layer in the hill has its exposed edge sooner or later turned to soil, of a quality similiar to the rock out of which it has been made, and of a depth proportionate to hardness or softness, solubility or insolubility of the layers now underneath it.

The Quality and Thickness of Soils.

It must be kept in mind that the term SOIL has two meanings; for there are two layers of it on the rock—an upper and an under; soil and sub-soil. The latter is the geological soil; the former is the agricultural soil. As the *sub-soil* is made of the rocks beneath it by *decomposition*, so the *soil*, in its turn, is made of the sub-soil beneath it by *composition*. The first change is purely chemical and mechanical, and would take place if there were neither vegetable nor animal life on the earth. The second change takes place through the agency of plants and animals.

A tree takes in its food through a thousand mouths—its leaves and its rootlets. By its leaves it consumes carbonic acid from the air, and by its roots it consumes water from the earth. Its process of digestion consists in separating from the carbonic acid the *carbon*, and casting back the oxygen into the air; and from the water the *hydrogen*, again casting away the oxygen into the air. It compels carbon and hydrogen to combine, and fixes them in its body as wood, bark, leaf, blossom, fruit and gum. It sends them, thus combined, to its twigs, and to the tips of its rootlets; just as an animal sends its own food to the top of its head and to the extremities of its wings, hands, and feet. Thus the tree lengthens itself, expands itself, rises higher and broader into the air, and burrows deeper and wider into the soil.

But in doing so it not only breaks up the sub-soil but fills it with solid carbon. The herbs, the grasses perish and leave their lower parts a permanent part of the sub-soil, while their upper parts rot upon its surface.

Meanwhile the earth-worms, beetles, ants, ground squirrels, ground hogs, &c., move about in the mass, open it, compress it, turn it up, and turn it over like millions of tiny plowshares, and weave together the upper and lower layers (the soil and the sub-soil) permitting the carbon to sink, applying ammonia to the constituents, and converting the whole into a sponge which the rains keep soaked, and penetrate, to attack the face and fissures of the rocks beneath; and thus the decomposition of the rock advances always more and more downward, and the sub-soil deepens; while the vegetation is adding layer on layer to the over-soil above.

1. The *quality* of the subsoil then must differ from the quality of the upper or true soil. The subsoil is the first change from the rock; the upper soil is a subsequent change from the subsoil. A geological survey should state, 1. The mineral qualities of the mother rock; 2. The mineral qualities of the subsoil; 3. The mineral qualities of the upper soil. And as these two sets of changes go on with different rapidity and in different manners according to the rock formation from which the change first starts, the investigation is a very broad one; in fact, should be pursued in every district of the State, and along the outcrop of every one of our formations.

The distinguished chemist, Doctor F. A. Genth, who is the official mineralogist of the Geological Survey, and chemist of the Board of Agriculture, has devoted a considerable part of his professional life to the analysis of soils and to the analysis of manures, both natural and artificial.

In speaking of the important part which (as everybody knows) *phosphorus* plays in agriculture, he has assured me that of the many hundreds of analyses of rocks which he has made, he never found a single one which did not contain phosphorus; sometimes, of course in such small quantity as to afford a mere trace; but, nevertheless, always *some.*

This leads us to the sure conviction that no soil is destitute of phosphorus, although some soils undoubtedly hold an insufficient quantity, and would be benefited by the addition of more through manures.

Now, if the quantity of phosphorus in soils greatly varies, as it must, it is evident that the farmer ought to know *beforehand* how much his own farm soil holds; so that he can decide what and how much of a phosphate dressing he shall give that soil, without having to go through a life time of experimenting himself—experimenting which must be, after all, as unsatisfactory and uncertain as it is tedious, anxious, and costly.

Still more needful to him is this scientific knowledge if his farm stretches across the edges of half a dozen different geological formations; for then he must necessarily have on his farm half a dozen belts of entirely different kinds of soil, each of which he knows by experience to require some sort of different treatment; but he ought to know exactly *why* the different fields in his farm cannot be farmed alike. He ought not to be content with *suspecting* that the soil in one of his fields has more phosphorus in it, and another less—or more sulphur, or more iron. He ought to be *certain* of it; and he ought to know exactly *how much* more, or *how much* less.

This is precisely the kind of knowledge which a geological survey is intended to give to farmers.

First, it should follow all the outcrops of the formation through the State.

It should find out the fixed order in which they lie to each other.

It should find out the width of the belt of soil which each one makes.

It should publish maps to show the farmer how these belts run through a county or a township. He can then easily find out for himself where they are in his neighborhood, and which of them cross his farm. He can decide for himself whether the geologists are wrong or right. He can increase his own knowledge by correcting their mistakes. For all men, in all businesses, must make mistakes. And ten to one he will have his eyes opened to a good many very important truths which he never thought of before, and to some important facts which he never had given himself the pains to look at or ask questions about, because he never knew that they could concern him—a farmer—not a miner or a furnace man—in any way at all.

It is astonishing how important to us certain things sometimes turn out to be which we have always thought concerned only other people.

A geological survey then having studied the order, the thickness, and the direction which different rock formations take across country and through the farms, its next business is to study the individual beds of each formation to see whether they are sandy, clayey, or limy, and whether they contain phosphorus, sulphur, potash, soda, magnesia, iron, &c., in large or small quantities relatively to each other. I do not mean as ores, but as rocks. For rocks are gradually turned into soils; and this study of the rocks leads directly to the knowledge of the soils.

If a rock is full of iron—not enough to make it an iron ore—it will make a soil rich in iron. If the iron is in the rock in the form of crystals or grains of iron pyrites, (sulphide of iron,) then its soil will contain a considerable quantity of sulphur.

If the formation be of limestone, and some of its beds are made up half of carbonate of lime and half of carbonate of magnesia, then the farmer's fields must necessarily be streaked with magnesian soils. He will call his farm "limestone land;" but in fact, his *real limestone land* lies only in streaks across his farm, the intermediate streaks being *dolomite land*, that is, half lime, half magnesia.

If a great many beds together are limestone, his streaks of limestone soil will be broad, and very distinct from his magnesian soil. But if on the contrary every alternate bed in the formation be limestone, and every alternate bed dolomite, then the streaks of different soil will be so narrow and numerous that the plowing of many years, and the slow creeping of the soil itself on the rock through ages, will have mixed the different streaks of soil together, and the whole surface will be of one general character, intermediate between pure limestone land and dolomite land.

When a farmer has resolved to lime his land he opens a quarry, and burns the stone. But *what* beds does he quarry and burn? The quality of his quicklime will depend entirely on *which* bed of rock he quarries. If he takes, as most farmers do, any rock which happens to stick its head above the surface, it may be a limestone almost pure from magnesia, or it may be a bed of dolomite, half carbonate of lime, half carbonate of magnesia.

A chemist ought to be able to tell him the difference, after analysing the rock. But the geologist alone can tell him whether the pure lime rock which he needs lies concealed to the right or to the left, above or below, north or south of the one which he has badly chosen for his quarry.

Still more important would it be if we knew how much phosphorus each of the limestone beds in a whole formation contained; for then those particular beds might be selected for quarrying and burning.

It was to settle the possibility of such precise knowledge, so useful to the farmer, that the geological survey undertook last spring a chemical investigation of about one hundred beds in the middle of the great limestone formation at Harrisburg. The investigation is not yet finished, but already knowledge has been obtained, which is new to geologists, and important, not only to farmers, but to iron men and others who use lime.

We have long known that the older limestone formations were highly magnesian.

We have long known also that in the midst of the magnesian limestones (or dolomites) lay beds of almost pure limestone; but it was not known what proportion of the limestone beds were magnesian, nor whether there was any order or regularity in the deposits.

We now discover a very remarkable (and still unexplained) alternation of magnesian and non-magnesian beds, as the following table will show.

The mixture of magnesia with lime in dolomite rocks has always stimulated and baffled geological speculation, and given birth to opposite hypotheses; some of them, such as that of the issue of magnesium vapors from the interior of the earth, absurd enough; others, such as that recently propounded by Mr. W. L. Green, British minister at Honolulu, who derives the magnesia from olivine in lava, very suggestive.

I have long felt that no sound basis for speculation was secured so long as the collection of facts consisted merely of analyses of sporadic specimens of limestone and dolomite rocks. I therefore directed Mr. R. H. Sanders, of the Pennsylvania Geological Survey, to make a careful section of the siluro-cambrian strata exposed for a quarter of a mile along the west bank of the Susquehanna river, opposite Harrisburg, both by the deep cuttings of the Northern Central railroad and by quarries. This was done in connection with his field work in Cumberland county.

The beds in the exposure lie perfectly comformable one upon the other, and dip regularly about 30° to the southward, down the river, and without plications.

Mr. Joseph Hartshorne was also directed to take duplicate samples from every stratum, thick or thin, in this section; one at railway grade, and the other at the top of the exposure (sometimes thirty feet high) and to analyse them in the laboratory of the survey at Harrisburg. This he has done, and is still doing, devoting his entire time and attention to the selection of the samples in *situ*, and their determination in the laboratory. In all cases of doubt, the analyses have been duplicated, and sometimes triplicated.

When analyses of the first forty-six beds (from the top) had been made, it was evident that the generalization which must, sooner or later, come out of this series of analyses and of others similar to it which geologists would undoubtedly institute, must be both interesting and important. I availed myself therefore of an opportunity at a meeting of the American Philosophical Society in Philadelphia, held December 21, 1877, to state what had been done by Mr. Hartshorne in the laboratory of the survey at Harrisburg up to that time, for the information of chemists and geologists at home and abroad; and this was published in the proceedings of the society in the following January.

In the course of the winter of 1878, Mr. Hartshorne continued his analyses. But in revising his work and comparing his numbers with those of Mr. Sanders he saw good reasons for changing, at one or two points, the numbering of the series. Some of the beds which Mr. Sanders distinguished apart, were considered by Mr. Hartshorne to be solid beds, and *vice versa*. The number of Mr. Sanders beds, (ninety-eight) was, on the whole, increased to one hundred and fifteen, leaving the sequence, however, unchanged.

Mr. Hartshorne being called away to take an important position in the Bessemer iron manufacture, the continuation of the work was intrusted to Mr. S. S. Hartranft, a graduate of Lafayette college, under the direction of M. A. S. McCreath, the chemist of the survey in the laboratory at Harrisburg. Mr. Hartranft completed analyses of beds No. 93 to No. 115, the last visible in the exposure, as numbered by Mr. Hartshorne.

The following is a tabulated statement of the general result.*

To show the extent of the investigation and the thickness of the whole exposed mass, as well as the relative thickness of each of its layers, I will give, first, Mr. Sanders' original series of numbers, thicknesses, and lithological descriptions, as follows:

No. of bed.	Thickness in ft. and inches.		Lithological Character.	
	Ft.	*In.*		
1	3	0	Limestone,	light gray.
2	2	9	"	gray.
3	3	6	"	dark blue.
4	4	6	"	dark gray.
5	8	1	"	dark blue, with numerous lenticular masses of flint.
6	2	0	"	dark blue.
7	0	9	"	light blue.
8	2	3	"	light blue; seams of calcite; a fault of 13 inches.
9	2	8	"	dark blue.
10	13	8	"	dark gray; some calcite.
11	5	7	"	dark gray; calcite.
12	3	8	"	gray.
13	12	8	"	gray.
14	4	4	"	dark gray.
15	2	9	"	dark blue.
16	2	8	"	dark blue.
17	1	0	"	light gray.
18	1	1	"	light gray; with calcite.
19	2	0	"	light gray.
20	1	2	"	dark gray.
21	2	0	"	dark blue; with some flint.
22	1	4	"	light gray; with some flint.
23	6	11	"	dark blue; with streaks of flesh-colored limestone.
24	0	7	"	light gray; with a great deal of calcite.
25	0	9	"	dark blue.
26	1	11	"	dark blue.
27	6	5	"	dark blue; seams of calcite.
28	4	1	"	light gray.
29	2	7	"	dark blue.
30	1	0	"	light gray; large amount of calcite.
31	3	2	"	dark blue; few veins of calcite.
32	6	8	"	dark blue; few veins of calcite.
33	0	10	"	light gray.
34	1	7	"	dark gray; calcite.
35	0	4	"	dark blue, with white spots.
36	4	6	"	dark blue.
37	0	10	"	light gray; with seams of calcite.

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* Brought up to date of publication of this lecture, October, 1878.

No. of bed.	Thickness in ft. and inches.		Lithological Character.
	Ft.	*In.*	
38	4	3	Limestone, dark blue.
39	8	2	“ light gray; seams of calcite.
40	1	2	“ dark gray; seams of calcite.
41	2	3	“ bluish black.
42	0	3	“ bluish black.
43	3	6	“ bluish black; black flint.
44	0	10	“ dark gray; with calcite.
45	0	5	“ light gray.
46	0	2	“ light gray; with calcite.
47	0	6	“ light gray; with calcite.
48	1	10	“ dark gray; black flint.
49	4	0	“ light gray; seams of calcite.
50	0	5	“ light blue.
51	5	2	“ dark blue; few seams of calcite.
52	0	11	“ light blue.
53	1	0	“ gray; veins of calcite.
54	1	10	“ gray; veins of calcite.
55	2	0	“ light and dark gray.
56	1	10	“ light blue.
57	0	10	“ light gray; spots of calcite.
58	2	4	“ dark gray; lenses of flint.
59	5	8	“ light gray.
60	6	4	“ dark blue; masses of flint.
61	1	9	“ light gray; seams of calcite.
62	14	0	“ dark blue.
63	2	10	“ dark gray; much flint.
64	6	6	“ dark blue; clearage planes calcite.
65	3	8	“ light gray; full of calcite.
66	4	6	“ dark blue; with calcite.
67	5	6	“ gray, with a reddish tinge.
68	3	7	“ light gray.
69	5	0	“ dark blue, with yellow streaks.
70	2	8	“ light gray.
71	1	2	“ bluish black.
72	2	3	“ light gray; calcite.
73	3	0	“ dark gray.
74	6	0	“ dark blue; some little calcite.
75	5	3	“ light gray; seams of calcite.
76	1	9	“ light gray.
77	6	8	“ light gray.
78	7	3	“ light gray; part flesh colored.
79	6	8	“ dark blue.
80	11	5	“ light gray; streaks of flesh colored.
81	1	5	“ light gray.
82	5	9	“ dark blue.
83	1	5	“ light gray.
84	2	5	“ dark gray.
85	4	9	“ dark blue.
86	5	10	“ very dark blue.
87	6	5	“ light gray; full of calcite.
88	17	8	“ dark blue.
89	3	9	“ dark gray; some calcite.
90	5	0	“ dark gray, and flesh colored.
91	8	9	“ dark gray.
92	1	2	“ light gray.
93	26	6	“ dark gray; several beds all alike.
94	5	6	“ light gray; calcite.
95	4	6	“ dark gray.
96	11	3	“ dark blue.
97	8	0	“ dark gray.
98	30	4	“ dark gray.
	425	9	

This last and lowest bed visible at the north end of the exposure is calculated by Mr. Sanders to lie 1280 feet above the lowest bed of the whole series of Cambro-silurian limestones in our State. This calculation is made by projecting curves according to all the observed dips, between the north end of exposure and the edge of the slate county to the north, checked by dips in a series of exposures on the east bank of the river. It is not necessary to go here into a discussion of the existence of a great upthrow fault between the limestones and slates.

The topmost bed No. 1 of the series is therefore 1280′ + 426′=1706′ above the Formation No. I.

The upper limit of the limestones, where they pass conformably beneath the Utica or Hudson River slates, is seen several miles down the river. By projecting dip-curves in the interval Mr. Sanders measures an additional thickness of limestones amounting to 1819 feet.

The total observed thickness of the great limestone formation (No. II of the old Pennsylvania survey, including representatives of Calciferous, Chazy, Birds' eye, Black-river, and Trenton limestones) is 3535 feet.

The beds selected for examinaaion lie therefore a little below the middle horizon of the mass, and undoubtedly belong to the "Calciferous Limestone Formation" of the New York geologists, the Magnesian Limestone Formation of the western geologists.

I will now give Mr. Hartshorne's re-numbering of the beds, with his and Mr. Hartranft's determinations of their chemical characters, but omitting their lithological descriptions. The recorded analyses are to the third decimal place; but in the following table only one (and the nearest) decimal is given, as this will not affect the law, and will assist the eye:

NUMBER OF BED.	Carbonate of lime.		Carbonate of magnesia.		Insoluble material.	
	1. RR.	2. Top.	1. RR.	2. Top.	1. RR.	2. Top.
1, ...	58.3	57.1	36.9	38.3	4.6	4.0
	58.4	57.2	36.7	38.2	4.6	4.0
2, ...	55.6	56.2	38.3	39.7	5.6	3.9
	55.6	56.2	38.7	39.8	5.3	3.7
3 a, ...	89.9	92.0	3.6	4.0	5.7	4.1
3 b, ...	67.2	66.5	3.2	4.1	26.6	25.3
4, ...	93.9	97.1	1.8	1.9	3.8	1.4
	93.9	97.0	1.8	1.8	3.8	1.4
5, ...	96.4	97.2	1.4	0.7	1.9	2.1
	96.4	97.2	1.4	0.7	1.9	2.1
Flint in 5, . .	6.5	9.3	0.8	0.3	90.8	89.9
6, ...	95.5	97.6	1.4	1.3	1.5	1.1
7, ...	87.1	87.4	3.6	3.7	9.7	9.1
8, ...	82.3	87.6	14.5	7.5	3.1	3.9
		87.3				
8³	72.2	. . . . .	21.7	. . . . .	6.3	
	72.3					
9, ...	68.3	67.6	24.8	27.0	5.5	5.4
9³, ...	63.6	. . . . .	30.9	. . .	5.1	
	63.6	. . . . .	30.8	. . .		
Calcite, . . .	88.7	88.6	0.8	0.9	10.4	9.9
10, ...	90.7	90.3	8.1	8.2	1.9	1.7
	. . . . .	90.5	8.0	8.3		
11, ...	97.6	96.7	1.8	1.3	1.0	2.2
12, ...	66.0	75.9	32.4	19.9	1.6	2.5
	66.0	75.7		19.8		
13, ...	96.8	97.3	2.3	1.8	1.2	1.4
		97.1		1.9		1.4

NUMBER OF BED.	Carbonate of lime.		Carbonate of magnesia.		Insoluble material.	
	1. RR.	2. Top.	1. RR.	2. Top.	1. RR.	2. Top.
14,	95.8 95.9	83.9 83.5	2.4	11.9 11.8	1.8	3.4
15,	92.4 92.9	97.5 97.1	4.4 4.5	0.8 1.2	3.4	1.8
16,	97.8	97.1	1.8	2.0	1.1	1.2
17,	97.7 97.5	60.1 60.3	1.1	33.4 33.4	1.1	5.9 5.9
18,	97.0	93.5	1.2	4.3	1.4	2.0
19,	65.3	62.3	30.8	34.5	3.5	3.0
20,	96.4	98.7	2.9	0.8	0.7	0.5
21,	76.3	71.5 71.8	18.5	24.3	5.3	4.2
22,	93.7	97.4	3.8	1.6	1.9	1.3
23,	65.3	64.3	30.8	28.6	3.4	6.5
Calcite, in 23,	87.7	. . . .	1.8	. . . . .	10.4	
24,	94.8	93.1	1.6	1.9	3.9	4.8
25,	68.9	68.9	23.8	23.6	7.4	6.3
26,	90.0	71.0 70.7	6.8	6.3	3.4	22.9 23.0
27,	63.3	75.7	28.7 28.5	18.1	6.2	5.6
28,	81.0 81.5	94.2 94.3	6.7 6.6	2.0 2.1	12.0	4.0
29,	65.0	62.4	29.1	31.4	5.4	5.4
30,	98.9	97.9	1.1	1.5 1.1	5.5	0.9
31,	61.0	64.1 64.5	27.7	25.0 25.4	10.9	10.3
32,	96.7	97.6	1.7	1.0	1.7	1.8
33,	73.3	71.9	12.4	15.5	12.4	10.4
34,	97.6	96.3	1.5	1.2	1.1	1.5
35,	75.2 75.2	67.0 67.5	18.8 19.0	25.6 25.7	4.7	5.9
36,	82.9	79.9	13.5	16.9	2.7	4.2
37,	91.0	89.0	5.4	5.8	3.6	3.6
38,	79.7	82.9	16.9	13.3	2.9	2.8
39,	89.7	98.7	8.2	1.6	1.6	0.3
40,	61.5	56.3	33.6	37.2	4.7	6.1
41,	96.9	95.8	1.7	2.2	1.4	1.9
42,	55.6	57.2 57.3	35.0	34.8 35.1	6.9	6.5
43,	97.8	91.0	1.3	1.3	1.3	7.9
44,	73.6	65.5	22.5	28.2	3.4	4.8
45,	96.2	?	2.0	?	2.4	?
46,	97.2	90.6	1.7	7.6	0.7	1.8
47,	63.4	68.2	29.5	27.1	6.4	3.6
48,	94.3	95.3	1.9	2.2	3.5	2.2
49,	57.8	66.2	33.2	26.9	8.0	5.7
50,	60.4	62.0	32.1	31.7	5.3	5.1
51,	92.9	95.7	3.2	2.9	3.0	1.7
52,	61.4	68.9	31.9	23.7	5.3	7.2
53,	84.1	88.7	10.0	7.0	4·7	3.4
54,	98.2	97.9	1.3	1.2	1.2	0.7
55,	79.8	79.5	10.8	13.4	8.6	6.9
56,	66.9	66.0	24.2	23.2	7.4	9.7
57,	91.6	91.0	2.4	2.3	5.9	6.8
58,	64.8	60.1	27.4	29.9	7.2	8.6
59,	97.1	99.3	1.8	1.3	1.1	0.2
60,	75.1	76.3	20.9	19.9	3.1	2.4
61,	89.3	95.1	1.5	1.8	8.9	2.1
62,	49.8	61.7	31.9	28.4	16.9	8.2
63,	71.0	72.9	23.8	23.0	6.0	4.9
64,	80.7	87.7	14.2	10.0	2.5	2.3
65,	67.7	70.0	20.9	21.5	10.2	7.8
66,	75.1	79.1	19.2	13.6	5.4	5.8

NUMBER OF BED.	Carbonate of lime.		Carbonate of magnesia.		Insoluble material.	
	1. RR.	2. Top.	1. RR.	2. Top.	1. RR.	2. Top.
67, ...	61.0	61.8	33.6	32.1	4.6	5.9
68, ...	85.1	96.0	10.4	2.3	3.2	1.9
69, ...	51.7	58.5	32.7	27.4	12.9	11.9
70, ...	98.2	97.4	1.5	1.4	0.8	0.9
71, ...	55.6	53.3	33.7	35.4	10.3	10.0
72, ...	98.1	97.3	1.4	1.6	0.8	1.2
73, ...	93.9	96.6	3.6	1.6	2.7	2.5
74, ...	95.6	96.8	1.5	1.2	2.8	2.1
75, ...	91.3	92.1	2.8	3.2	5.4	5.1
76, ...	64.9	63.0	23.6	26.7	10.6	9.8
77, ...	85.5	97.9	9.8	1.8	4.5	1.0
78, ...	56.7	56.0	31.9	31.5	8.5	10.8
79, ...	86.7	85.2	7.1	8.7	5.0	5.5
80, ...	79.8	95.9	9.9	2.0	9.4	2.6
81, ...	54.9	56.7	35.7	24.0	7.7	18.4
82, ...	84.7	86.9	10.8	8.5	4.1	4.0
83, ...	90.7	91 0	8.0	7.6	1.7	1.9
84, ...	66.8	75.6	27.2	16.3	4.4	5.6
85, ...	97.0	93.7	0.9	4.1	8.6	2.1
86, ...	95.4	98.9	1.3	1.1	3.8	0.6
87, ...	52.0	54.1	33.7	28.1	12.5	15.9
88, ...	96.3	98.4	1.9	1.1	2.2	0.7
89, ...	59.4	61.6	33.7	31.8	6.1	5.9
90, ...	97.6	97.6	1.8	1.5	0.9	0.3
91, ...	68.2	74.1	27.9	23.1	3.9	3.0
92, ...	98.2	97.7	1.3	1.9	1.2	0.6
93, ...	58.6	59.2	34.1	35.1	5.6	5.0
94, ...	96.7	85.5	1.4	1.4	1.8	12.6
95, ...	54 8	55.2	31.1	30.6	13.0	12.9
96, ...	95.8	95.4	2.7	2.2	1.3	1.8
97, ...	75.2	77.6	17.3	16.4	6.7	4.8
98, ...	62.0	60.0	29.4	32.8	7.8	6.7
99, ...	96.3	96.0	1.9	3.2	1.1	0.9
100, ...	62.2	62.5	29.5	27.4	8.3	7.1
101, ...	98.2	98.8	1.2	0.8	0.6	0.3
102, ...	64.4	60.4	30.5	34.2	4.3	4.8
103, ...	94.7	93.1	4.6	4.8	1.0	1.4
104, ...	80.2	79.5	13.2	14.7	5.6	4.3
105, ...	98.2	96.9	1.2	1.6	0.6	1.1
106, ...	63.4	63.3	31.6	31.7	3.8	4.1
107, ...	98.2	99.0	1.6	0.5	0.3	0.4
108, ...	65.0	65.0	29.1	29.6	5.1	5.0
109, ...	94.8	86.9	2.5	4.3	1.8	7.7
110, ...	73.1	64.3	16.5	22.3	9.1	11.6
111, ...	94.5	88.4	2.7	8.3	1.9	2.6
112, ...	54.4	54.4	35.2	36.2	8.4	7.7
113, ...	98.1	76.2	0.9	3.7	1.0	18.2
114, ...	64.6	55.4	26.2	33.8	8.5	9.7
115, ...	95.1	97.7	1.9	0.9	1.7	1.4

Without discussing in detail, at present, this instructive table, several things are evident at a glance, viz: that

1. Alternate strata of limestone and dolomite make up the mass.
2. The dolomite layers carry the most insoluble materials, as a rule.
3. Specimens taken from the top and bottom of the cut (thirty feet apart, or less) differ *sometimes* as notably from one another as specimens taken from different beds; but, *as a rule*, each layer is nearly homogenous, so far as two or three analyses can show such a rule.
4. Not one of all the so-called dolomite layers has enough carbonate of

magnesia to make it a true lithological dolomite. They are all merely more or less magnesian limestones.

5. Carbonate of magnesia is not absent from any bed in whole series; but in an extensive range, (such as from No. 84 to No. 115,) out of thirty-two beds, *twelve* show less than two per cent., *three* show less than three per cent., and only *one* goes up to four and six tenths per cent. The remaining sixteen beds, alternating with other sixteen with great regularity, carry from thirty-six to fourteen per cent.; *nine* of them ranging between thirty-six and thirty, *five* between thirty and twenty-five, *one* sinking to seventeen, and *one* to fourteen per cent.

The alternation in these thirty-two beds may be represented to the eye thus:

Per cent.															
35 and over, . .															
30 to 35, ...	. .	. . .	87	. .	89	. .	91	. .	93	. .	95	. .	. .	98	
25 + ...	84														
20 +															
15 + ...	. .	. . .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	97		
10 +															
5 +															
0 + ...	. .	85,86	. .	88	. .	90	. .	92	. .	94	. .	96	. .	. .	99

Per cent.																
35 and over, .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	112			
30 to 35, . . .	100	. .	102	. .	. .	. .	106	. .	108	. .	. .	. .	. .	. .	114	
25 +																
20 +																
15 + ...	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	110					
10 + ...	. .	. .	. .	. .	104											
5 + ...	. .	. .	. .	103												
0 + ...	. .	101	. .	. .	. .	105	. .	107	. .	109	. .	111	. .	113	. .	115

It is especially remarkable that so few of the beds occupy an intermediate position, chemically considered, between, almost pure limestones and almost pure dolomites.

The cause of all this is at present wholly conjectural, and speculation upon it is rendered all the more difficult and doubtful, by reason of the total absence of fossilized organic forms. We know that the seas of that remote age furnished a home for incredible numbers of invertebrate living beings; for the remains of cephalopods, gasteropods, brachiopods, articulates, lamellibranchs, and bryozoa obtained from these rocks fill the museums of Europe and America; but they seem to have lived along the shores. Their remains are extremely scarce in Pennsylvania, where the sea seems to have been deep. Probably they were dissolved, in the manner described by Mr. Alex. Agassiz in his recent report on the animal forms obtained by dredging the bottom of the Carribean sea.

It must not be taken for granted that the whole mass of three thousand five hundred and thirty-five feet of magnesian limestones (as measured by Mr. Sanders along the Susquehanna river) consists of regularly alternating layers of dolomite and limestone, merely because we have proved by the above analytical investigation that such alternations exist in a part of the mass more than four hundred feet thick; but since the layers studied occupy a place towards the middle of the mass, and are fortuitously exposed opposite Harrisburg, it is certainly not an improbable supposition that the entire formation from top to bottom is subject to this remarkable and mysterious law. Such a law, whatever be its restrictions, demands the earnest attention of chemists and geologists.

But such a law imports much, also, to the agriculturist. Farmers will take a practical interest in it when they come to see its practical bearing on their system of mineral manuring.

I must remind you here that the geologist proper has nothing to do with the physiology of plants and animals, in relation to agriculture. Agricultural chemists take charge of this subject.

But it is necessary for the geologist to keep in view what plants require in the shape of food; and that this they get partly from the air and partly from the soil.

1. It seems to have been proved, by a sufficient number of experiments, that if a soil does not contain a sufficient quantity of *each and all* of the following minerals: Phosphoric acid, sulphuric acid, potash, lime, magnesia, oxide of iron, it may be considered a barren soil. Not only each of these, but all of them, are needful. If any one of them be absent from a given soil, seeds can not germinate, plants will not grow in it.

2. But these elements must also be present in a form which plants like. They must be, so to speak, digestible. Many fruits and roots of the earth are food for man only when they have been cooked. Animals live upon the same elements as plants, but only after the plants have prepared the elements to suit the constitutional digestion of animals. Plants require phosphorus; but if it be in the soil only in the form of *apatite* or crystalline phosphate of lime, the plants cannot use it. Hence, artificial manures are made out of ground apatite treated with sulphuric acid, to render the phosphoric acid soluble in water, and then plants can imbibe it. The "phosphatic guanos," which are so extensively used by farmers, are made from nodules of apatite, found in the marls of South Carolina, and these are relics of the marine animals which lived in the geological age immediately preceding the present. The phosphate of lime in animals, their bones, has a texture which makes it much more soluble than the mineral apatite, and hence bone dust manure is better than mineral manure.

Plants require magnesia; but they will not take it from serpentine rocks, although these are largely made up of magnesia in combination with silica and water. But on magnesian limestones plants thrive.

Plants require potash, and potash is abundant in some of the feldspars which make up granite, gneiss, and sand rocks. But a plant would starve to death if it had to suck out the amount of potash it wanted from feldspar grains and crystals. On the other hand, such minerals as *carnallite* and *sylvite*, (Stassfurt,) containing large quantities of chloride of potassium, make a good manure. A still better form of potash, in a condition perfectly acceptable to plants, enabling them to absorb it with great ease, is *glauconite*, *i. e.* the green grains in the Jersey marls. The best green marl contains ten or twelve per cent. of potash (equivalent to the potash of commerce.) But the best of all forms in which potash can be offered as food to plants is that of wood ashes, or straw, or the leaves and twigs of trees; for the plant may then be said, poetically, to do what the cow does when she first chews the cud and then swallows and digests it. The ashes from burned wheat straw consists nearly one half (forty-seven per cent.) of potash; the ashes from oak leaves are nearly one quarter (twenty-four per cent.) potash. Potash makes up one sixth of the weight of maize stalk ashes; more than one eighth of grapevine ashes; one twentieth of flax; one fourtieth of willow, and one hundredth of pine wood ashes. That is one reason why the annual droppings of a natural oak forest make a soil in which underbrush flourishes; while the soil of a pine forest presents so bare and sandy an appearance. It is not indeed the only reason, but it is an important one.

It is a remarkable fact, that the two most abundant mineral elements in our rocks, *alumina* and *silica*, the bases of sand and clay, are not used by plants at all as a part of their food necessary for sustaining their life, but only in a mechanical way to glaze or stiffen their stalks, or to mix with their bodies without either hurting or helping them.

Soda also is almost absent from the bodies of plants. Animals therefore, to whom it is quite indispensable, are obliged to get it in other ways; and hence wild animals betake themselves to salt licks, and tame animals grow fat when driven to pasture for a time on salt marshes.

As for nitrogen, which plants cannot do without, it can hardly be found in any rocks, and therefore must get into the soil not from below, but from above, viz: out of the air, (which consists of seventy-seven parts by weight of nitrogen, twenty-one of oxygen, and the rest of carbonic acid, watery vapor, and a very little ammonia.) Ammonia is itself a compound of nitrogen and hydrogen.

It is from the carbonic acid of the air that plants get the carbon with which to build up their bodies.

The ammonia of the atmosphere supplies plants with what nitrogen they need. In doing this, it first unites with sulphuric and other acids in the soil. Animals supply a large quantity of ammonia to vegetation in their urine. Hence the value of barn-yard and privy manure. The wild animals, large and small, are thus all the while manuring the forests and the fields without asking permission of the farmer. Every squirrel and ground hog helps to care for the healthy vigorous growth of the tree he lives on or under. The air deposits part of its nitrogen, in the form of saltpeter, in every cave and quiet nook, and under eaves, and boards, and fallen trees, where the salt is protected from the rain. And, indeed, everywhere else; only that in unprotected places the rain dissolves the niter, and washes it into the soil. Nitrogen is abundant in the hair and horns of animals. Ammonia got its popular name of "hartshorn" because it was at first distilled from horns. Although the mice eat up all the horns which deer shed and drop in the forest (so that by June, nothing is left of them but their tips) the ammonia is not lost to the soil, for the mice pass it through their own bodies to the earth, to fertilize which it is surely destined.

With this whole subject of the animal and vegetable manures, the geologist has nothing to do. It is not his business to discuss the compounds of carbon and water, which make wood-fiber, starch, sugar, and gum; nor the compounds of carbon, hydrogen, and oxygen, which make the pulp of fruits and roots; nor the fatty and oily parts of plants; nor those mysterious and beautiful acids which give taste to the apple, the lemon, the strawberry, and a thousand other products of the marsh, the forest, and the orchard; nor those more complicated compounds of carbon with the three gases, oxygen, hydrogen, and nitrogen, out of which come the milk of animals, the white of eggs, the fiber of muscles, the pulp of the brain.

All that the geologist has to deal with for the farmer's sake may be limited to what he finds in the ashes of plants: the phosphates, the sulphates, the chlorides, the silicates, the carbonates—of five metals: Potassium, sodium, calcium, magnesium, and iron.

These are the mineral constituents of the rocks, and of the subsoil; and these are the mineral constituents of the upper soil also, but are *in it* mixed with decaying and decayed vegetation: The roots and leaves of plants; the dung, manure, and dead bodies of animals; and the nitrite salts and ammoniacal compounds which rain water has brought into or developed in it.

One point, however, is very important, and it is this: Plants are, in general, exceedingly small eaters. Temperance, even abstemiousness, characterizes their society. The weeds are rather gluttonous; corn and timothy have good round appetites. But the trees live on next to nothing. All the plants, indeed, offer an amazing contrast to the voracity of the animals (especially the smaller ones) which eat them up, either alive or dead. The largest tree weighs but a few tons after living a thousand years. Most of its food has been a watery solution of charcoal, flavored with a little salt. It is this flavoring salt, or rather compound of the salts mentioned above, which inspires the curiosity of the geologist, and demands the study of the farmer, the study of years, regardless of trouble or expense.

An acre of ground may be said to have upon it four thousand tons of soil, if the soil be two foot deep. Of this, only forty pounds weight is removed in the shape of *seed*, by harvesting a crop of grain of thirty-three bushels; and one hundred pounds more in the shape of straw. A hay crop of two tons carries off only two hundred and sixty pounds of mineral matter.

Suppose a farmer should want to get from five hundred tons of perfectly barren soil, spread over an acre of ground, a crop of thirty-three bushels of barley, and one ton of straw, how much soluble potash, soda, magnesia, lime, phosphoric acid, sulphuric acid, chlorine, and nitrogen (in the form of nitrates) must he put into it, or find in it? Hellriegel, after much experimenting, was able to answer the question thus:

55 pounds of potash.
17 pounds of soda.
17 pounds of magnesia.
23 pounds of lime.
55 pounds of phosphoric acid.
11 pounds of sulphuric acid.
8 pounds of chlorine.
54 pounds of nitrogen.

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240 pounds in all, and (minus nitrogen) only
186 pounds of mineral substances. This will suffice to produce the 140 pounds of seed and straw required.

You see then what successful farming can be done on a very shallow depth of soil, if the farmer be a knowing man.

This brings me to the second part of my subject, viz:

2. That other essential feature of soil, as a geological phenomenon, namely, *its depth*.

I have spent so much time in speaking of the *quality* of soil, that I have only time enough left this evening to draw your attention to the geological fact that the depth of any kind of subsoil depends upon the character of the formation over which it lies, and out of the edges of whose beds it has been manufactured by the processes of nature.

In the banks of the Schuylkill, below Philadelphia, one can see how the feldspar rocks have been mouldered by weathering into subsoil to a depth of several yards. Along the foot hill country in front of the Blue Ridge, in Virginia and North Carolina, the rocks have been converted into subsoil to a depth of sometimes one hundred feet. Many of the clay shale beds of Middle Pennsylvania are decomposed thus to a great depth beneath the surface. This is the process that has converted our rock-fossil-ore-beds into soft fossil ore for one hundred or even two hundred feet down; while the sandrocks alongside of them have turned into subsoil for only a few inches. All kinds of rocks are thus mouldered, more or less, by the long continued action of the carbonic acid of rain water. But their powers of resistance differ immensely. Some outcrops make soil so slowly that they lose it by the washings of the weather as fast as they get it, and so they remain standing above the surface with a rugged and forlorn aspect, much to the discomfiture also of the farmer who owns them, and does not know what to do with them. This is what makes our mountains. Their rocks are indestructible, except by ice. They stand high in air, while the rocks of the valley formations are mouldering and lowering their richly soil-covered surface nearer and nearer to the level of the sea. Our observations teach us, beyond a doubt, that the surface of this limestone and slate valley of Cumberland and Dauphin county was, in past geological ages, many thousand feet higher above sea level than it is to-day. And you all know what destruction is still going on under the surface—how many hundreds of caverns underlie the farms of this district. It is easy, therefore, for the mind's eye of the geologist to see the whole of nature's process of manufacturing soils in perpetual activity.

Still one more geological point must not be forgotten.

The soil which lies on a dead level remains nearly stationary where it was made; that is, on top of the rock out of which it was made.

But the soil of a hillside is all the time creeping down the slope—very slowly, indeed, but very surely, and all the time. Every time a summer shower saturates it, part of its elements are dissolved and percolate away, and the insoluble parts shift their place a little, and, of course, down hill. Every winter's frost expands the mass and shoves it a little further down hill. Any one can see the evidences of the operation if he chooses to look for them. The coal miner knows perfectly well that he must look for the blossom of a coal bed a good way down hill below where the bed lies in the rocks themselves. The whole surface of the earth is sliding down hill from the hill tops towards the valleys. All soils slip sideways from off their mother rocks down over the mother rocks below them. The geologist who is studying soils for the farmer must take account of this, and not mistake the soil of one rock for that of another.

I have occupied too much of your attention this evening to go on longer.

I should be glad to give, also, a succinct account of how far the geological survey of the State has advanced; but it would be a long story; for a great deal has been done. I must, therefore, refer you for this, to the official Reports of Progress published in separate volumes by the Board of Commissioners of the Survey.

I cannot tell how practical my remarks may seem to you to be, for they are necessarily mixed with much which is theoretical or scientific. This marvelous plant life, this universal development of intimate relationships between the inorganic and organic worlds, between geology and agriculture, is an exceedingly interesting subject. Whole volumes have been written on it, and placed in the libraries; and still this many-sided phenomenon of plant life on the planet takes such hold of our imagination and appeals so forcibly to all our human sympathies, that it is a great delight to attempt to picture and explain it to an intelligent audience. I thank you for the attention you have given me this evening. [Applause.]

The Governor has just suggested that I should answer interrogatories, and if you desire to make any, I shall be happy to answer them to the best of my ability.

Mr. **BEEBE.** I would like to inquire whether the gentleman would be willing to give his theory of the origin and extent of the phosphates of South Carolina, in and about Charleston?

Prof. **LESLEY.** I have no special theory in regard to that, and only the general kind of knowledge which others possess, since I have never made a personal investigation of those deposits, and have only passed cursorily through the district. It is perfectly well known, however, that these phosphates have had an animal origin. They are the remains of animal organisms, although very much deformed. The presence of many large bones and teeth in them, shows that the animal life was large and abundant. The fact that these deposits are found at the mouths of rivers, and on the edge, or near the edge of the Atlantic, shows that the deposits were made in the shallows on the sea coast, and that in them were mingled the remains of both marine and river fish. There are extensive deposits of fine clay and sand containing incredible numbers of scales, teeth, and bones of fish, found in geological formations of much older date. In the Catskill rocks, for instance, there are three such layers of fish, lying as if they were all brought there at once. In the Iceland eruptions millions of dead fish floated on the surface of the sea, and were doubtless buried in the sea bottom. So in South Carolina it is possible marine animals may have been thus destroyed in immense numbers, or they may have been especially numerous, and died in the usual way; but in either case, their solid parts have been turned into phosphates, in conjunction with other organisms of the vicinity. How they were thrown there at the time they were, and the various movements of the land around, about, over and through them, would require a good deal of time to discuss in detail.

Hon. **WILLIAM IRVIN**, of Butler. I understood Professor Lesley to say, that certain formations are seventeen thousand years old. How does he reconcile that with the sacred Word?

Prof. **LESLEY.** I do not try to reconcile the two; anybody may do that who pleases. [Laughter.] The business of the geologist is to observe facts in nature, and to draw scientific conclusions from them for the practical benefit of society. I should add, that the phosphate deposits seem to range in belts parallel with the present sea shore. But these belts are in many places concealed beneath later deposits, which form the present surface of the country. The phosphate deposits have been cut down through by the rivers, and their edges show on the river banks.

Mr. **EDGE**, (the Secretary.) Are those broken belts found to be deeper in the center, and do they indicate deposits?

Prof. **LESLEY.** They are certainly deposits of the ordinary geological kind, and seem to share in the general slope of the rock deposits from the interior of the country towards the sea. It is therefore likely, and those whose judgment I respect, are disposed to believe that they pass under the present ocean bed.

Hon. **A. J. QUIGLEY.** Will you be kind enough to give the theory of coal oil?

Prof. **LESLEY.** I think we had better wait until Mr. J. F. Carll's third Report of Progress is published by the Board of Commissioners. The truth is, I *know* absolutely nothing of the origin of coal oil, and I do not believe that any body is yet competent to answer that interesting question. I can give my opinion like another, but it will not be worth much. There is a school of geologists who suppose petroleum to be the product of the distillation of the lower devonian (Marcellus) black slates, which we know very well to underlie the oil rocks at a depth of from one to three thousand feet, and which outcrop in many of our valleys of middle Pennsylvania. They are full of bitumen. The opinion is extensively held, that the interior heat of the globe has distilled this black formation, and that the distilled coal oil has ascended slowly, and has been arrested by and stored away in the oil sands.

Other geologists of high reputation say that this is impossible, and appeal to chemical analysis to support their opinion.

There have been speculative minds rash enough to imagine that the whole of our petroleum deposits have been manufactured from the interior of the planet, out of the gases, hydrogen and carbon, in their pure and simple state after they have been set free from previous combinations in various solid form. But this idea is not entertained by any geologist so far as I am aware.

It is a very common notion that all of our rock oils have come from coal beds. But that cannot be, and the old refiners found that out before the first oil wells were drilled. Mr. Young of Glasgow, and the early refiners never went to the bituminous beds to distill coal oil. They always used cannel coal, or the cannel-like roof shales of coal beds. Out of this material they could get coal oil; but they could not by any process get it out of coal properly so called. The fact that these cannel shales still hold coal oil shows that the petroleum has not been distilled out of them into the oil sands. The botanists teach us the reason why the bituminous coal beds haven't it. They show that coal proper has been made out of the woody fiber of air-breathing plants; whereas cannel and cannel slate is a muddy deposit made up to a great extent of the decay of water-plants which have no woody fiber in their constitution, but are like jelly fish. Our geological survey has completely demonstrated the fact that our petroleum deposits have had nothing at all to do with our coal formations.

Another hypothesis, which I am myself inclined to favor, is this: Petroleum is the natural product of the decomposition of great quantities of sea weed and jelly fish, that is, of all kinds of gelatinous animals and gelatinous plants, living in the sea, or on the coast, hundreds of thousands of years ago, in the devonian age, when western Pennsylvania was all water; or, as we may express it, when the gulf stream occupied the place where our Allegheny mountains now stand.

What the geological survey has done in the study of petroleum is this: It has not settled the question of its origin at all; nor do I believe it can entirely settle that question. But the geological survey has done something a good deal better. It has for the first time counted the number of horizons at which the oil lies, and settled the exact order and position of them. And it has done this in the most conclusive manner, by thousands of facts actually observed.

It has shown that the sand deposits which hold petroleum lie at very different heights in the series of the rocks; the highest being two or three thousand feet (geologically) above the lowest. The highest is in the middle coal measures; this is the Dunkard creek or Greene county oil. The next below it is at the base of the coal measures; this is the Smith's Ferry or Beaver county oil. Then come, far underneath the last, the regular Butler county oils. Hundreds of feet under them lie the rocks of the Warren county oil. Under these again lie the curious rocks which hold the Bradford or McKean County oils. Far below these lie the Canada oils; and below these again the South Kentucky oils. We have also proven the oils from these different horizons to be very different from one another; and that the gases which come from these different depths are also of different kinds. The amount of work done to collect and verify these facts has been something enormous. We have not yet got to the end of it quite; but we have made that much advance, and the results are practically useful; which is much better than settling any number of merely theoretical or speculative questions.

Mr. **Keller** (of Schuylkill) moved that a vote of thanks be tendered Prof. Lesley for his able and interesting lecture; which was agreed to.

The President then announced that the next business in order was the reading of an essay on

FRUIT GROWING AS A SOURCE OF PROFIT TO FARMERS.

By Dr. James Calder, *President Pennsylvania State College.*

It is evident that farmers, in general, pay too little attention to the growing of fruit. Comparatively few of them extend their efforts in this direction beyond the care of an apple orchard, and the planting and subsequent neglect of a few peach and cherry trees. Many are led into this course by their want of appreciation of good fruit; and others, no doubt, by the belief that they cannot make fruit growing a source of profit.

Entertaining, as I do, the belief that many more farmers than are now engaged in fruit growing could do so profitably, I will mention some points, attention to which will serve to make the undertaking a success:

I. If Possible, Select Your Location near the Best Markets.

Most fruits are easily injured by transportation; and, as with all other commodities, distance from market increases the cost to the consumer, and diminishes the number of purchases. Then, other things being equal, it is evident that he may hope for the largest receipts whose farm is nearest to that market where is found the greatest number of consumers of fruit.

We have illustrations of this in the advantages possessed by farmers in New Jersey, whose lands are near to Philadelphia or New York, and those in Delaware and on the eastern shore of Maryland, who, by means of water and railroad communication, have almost hourly access to those great cities.

But the extension of our lines of railway, and the perfection of methods of carrying fruit speedily and safely, have done much to give even the remote farmer a satisfactory nearness to markets. Thus, even those who live on the Pacific slope, now include among their customers, as to certain varieties of their fruits, consumers who live on the shores of the Atlantic.

II. Select such Fruits and such Varieties of them as are Adapted to Your Market.

The tastes of people differ greatly, and their tastes must be considered and gratified, if one would make money by selling to them. That the Delaware grape is sweeter and more refined than the Concord, will hardly be questioned; and yet "the Concord is the grape for the million," and the shrewd grape-grower makes a note of the fact. Some grape eaters have not yet advanced beyond a fondness for the Isabella and the Clinton. Much as we pity them, it is evident that if we sell grapes to them in paying quantities, the varieties which we offer them must not be first-rate in quality.

Still, much can and should be done to introduce to popular favor, kinds of fruit which are beneficial to health, and pleasant to the palate. The taste of the people can be educated and refined indefinitely; and farmers can be helpers in the good work.

III. Select such Fruits and such Varieties of them as are Adapted to Your Climate and Soil.

Experience has shown that climate and soil have much to do with the determination of the question of successful fruit growing. Varieties which will flourish on one kind of soil, will fail on another, and those which produce at one elevation, or in a certain exposure, will be unprofitable under other circumstances. The Catawba grape rots and mildews so badly that it is hardly known on our lands in central Pennsylvania, and yet it flourishes on the shores of Lake Erie, and on the south side of the South Mountain. A better and more productive peach than the Susquehanna or Griffith, when grown in its native locality, the house yards of Harrisburg, cannot be found. But if planted in the field or orchard, even if within five miles of this city, it is a very shy and unsatisfactory bearer. The Agriculturist strawberry rejoices in the sands of New Jersey, but is worthless on our strong Pennsylvania soil; while the Triomphe Gand will do nothing there, but responds heartily to the influences which are met here.

IV. If Possible, have a Variety.

The difficulties arising from unfavorable seasons, ravages of insects, and competition from other producers, combine to teach the farmer that his loss or profit cannot be built upon the cultivation of any one kind of fruit, much less upon any one variety of that kind. We run an unnecessary risk when we aim to make money by growing, for instance, apples alone; and much more when we confine our efforts to one variety, even though it be so good a one as a Belle Flower or the Rambo. While we plant most largely of the kind which suits our soil, climate, and market best, we should remember the old adage, and "not put all our eggs into one basket."

Many kinds of fruit can be grown together. Thus, among our apple and pear trees, which come into bearing comparatively slowly, we can set out peach trees, which come to maturity soon, and will probably finish their course before the apples and pears get large enough to require all the ground. While the trees are small, we can profitably plant among them raspberries, strawberries, and other low growing varieties of fruits, which will induce us to stir the soil, to the advantage of the young trees, and will bring in receipts more than equal to the annual outlay on the young orchard.

All the ground devoted to fruit should be occupied by fruit. Do not many of us find our orchards to be failures, because we begrudge the ground they occupy, and seek to make them, at the same time, fields for wheat or hay? We do not so treat the lands which we devote to the growing of hay or wheat.

Further, under this head, we would call attention to the fact that certain kinds of fruit could be profitably grown to a much greater extent than they are at present. Thus, quinces will flourish almost anywhere in Pennsylvania, and they always meet a ready sale, at good prices. But how few farmers have them? And those who own them have but few, and neglect even these.

New kinds of fruit, such as have not been known in our section, or even in our land before, should be experimented with, and such as may be found adapted to our circumstances should be planted, and, in due time, offered to our customers. In this connection, I venture the opinion that the Chinese persimmon will do well in our State, and that it can be profitably introduced here. From that which I found it to be in China, I believe our people would soon come to regard it as a great acquisition, both delicious and healthful, quite the opposite of our almost worthless native variety.

V. Plant other Crops among your Young Fruit until the Latter shall need all the Ground.

If the circumstances are such that you do not desire to put berries, for instance, among your young fruit trees, you can fill up the rows and intervals with garden vegetables. This, particularly in the case of apple trees, may be continued with advantage for a number of years; and thus the growth of the orchard be promoted, while almost as much will be made from the ground as if the trees were not there. Our thrifty German immigrant teaches us a lesson on this point which even worldly wise Americans may profitably consider. He puts into the spaces between his favorite cabbages, beets or onions, and then further crowds out the weeds, and fills his pockets by setting everywhere else in the rows and alongside of them, plants of head lettuce.

Carry on Fruit Growing Systematically and Vigorously as you can.

If experience has taught you that you can hope to raise but few kinds profitably, as apples, or grapes, or peaches, pay chief attention to those. Plant only the best, and plant enough of them. See to it that your stock is not only true to name, but also healthy, free from worms, and not too old at transplanting. Having set the plants out properly, care for them thoroughly, mulching them, cultivating them in the proper season, training and pruning them as they make growth, and guarding them from the ravages of worms, insects, mice, etc.

VII. Market your Fruit in the Best Condition.

Some men fail to make money even from good fruit, because they are careless, or slovenly, or dishonest in their method of presenting it to purchasers. Except in rare cases, and for peculiar uses, all fruit should be ripe when offered in market. If it is not ripe it should not find sale. It should be sound also. If the quantity on hand is large enough to justify, it should be carefully assorted, the best specimens put by themselves, even though they be few in number, and the least valuable placed by themselves. This will enable consumers to choose according to their purposes or means, and will most likely secure buyers for all the grades. To so arrange one's fruit in the boxes or crates as to have the finest specimens on the top, while below are mere odds and ends, is to act dishonestly as well as most foolishly. Fair dealing as to quality, quantity, and price, will always pay best in the long run.

Much attention should be given to the baskets, crates, or boxes in which the fruit is marketed. They should be neat, convenient in size, and attractive in appearance. Labels setting forth the name of the fruit and of the grower of his locality will greatly add to the attractiveness of the stock and the satisfaction of the purchasers. We would make more money if we were more mindful of the fact that buyers are largely influenced by their eyes, and that the sight often dictates peremptorily to the appetite.

VIII. Preserve in a Fresh State, or as nearly so as Possible, the Fruit for which a Market cannot be found immediately.

It is a disastrous error to suppose that fruit which cannot be sold as soon as it is ripe must be suffered to rot or be fed to the swine, or, what is worse, must be turned into wine or brandy. It is entirely practicable, and is not too laborious to so dry or can or otherwise preserve fruits as to do a great deal of good with them, and receive a handsome pecuniary return in addition.

Farmers who live at a great distance from market will find that while their location deprives them of some of the opportunities of securing profit from fruit-growing it cannot deprive them of all, but that by the course here indicated they too can swell their gross receipts.

IX. Transportation Companies can do Much Toward securing the Object which we are speaking.

By arranging convenient places for receiving the fruit of a neighborhood, affording quick transit without re-shipment, returning the empty packages to the owners, and making the schedule of charges as low as their own interests will justify, they will enlerge the income of distant producers, and certainly pay better dividends to their stockholders.

X. There are Related Departments of Labor which may be made to swell one's Receipts.

He who grows fruit extensively, may without inconvenience establish a small nursery, from which he can not only supply trees and plants for his own grounds, but also sell stock for the use of others. This is especially true as to berries and grape vines. In the ordinary course of student instruction in our college vineyards, we laid down within the last year several hundred vines which made most satisfactory growth, and were worth a handsome price.

To a slight extent, horticulture could be pleasantly, appropriately, and profitably carried on with fruit growing. We need ornamental plants and shrubs for our grounds, and such as we can spare can generally be readily sold under the circumstances in which we find a market for our fruit.

So the keeping of bees, facilitated by the culture of fruit, may be advantageously connected therewith. If any one objects that bees will injure the fruit, and render it unsalable, I would reply that I have never had proof of their doing so. As far as my observation extends, their attention is all drawn to such specimens as have been injured or are too ripe to be marketed.

And now, in conclusion, I would say that we cannot safely affirm that all farmers everywhere can make extensive fruit-growing profitable to themselves. The points before stated forbid such an inference. Location, soil, climate, and other material facts must be consulted before the question can be determined.

But much can be done by the diligent and enterprising farmer to overcome existing dificulties. By the careful selection of varieties and the judicious marketing of his products, he can develop and educate the public taste, and make for himself an additional branch of industry which will bring him more nearly into the line of labor which the Creator first assigned to man, and which all experience proves, like charity, blesses both him who gives and him who receives.

At an adjourned meeting of the Board, held Thursday January 24, 1878.

Board called to order at half-past nine A. M., by Governor Hartranft in the chair, who announced, as the first business in order, the reading of an essay on

THE BEST BREED OF SHEEP FOR PROFIT.

By EASTBURN REEDER, *Member from Bucks.*

The particular branch of sheep husbandry which I have been appointed to discuss is the question, "Which is the best breed of sheep for profit, and why?" This question applies, of course, to the State of Pennsylvania. In expressing my preference of breeds of sheep as best adapted to our State, considering our soil, climate, and markets, I give it unhesitatingly in favor of the Southdown variety and their various crosses. I say this not because I am a breeder of Southdown sheep, but I have chosen to breed this variety of sheep because I think them best adapted to our wants and locality.

The question of the origin of breeds in our domestic animals may be even more remote than the confusion of tongues and the establishment of nations among the human race. The first inhabitants of the earth traveled about from place to place with their flocks and herds, changing their locations as subsistence became scarce or abundant. Perhaps to Jacob, the father of the children of Israel, may be ascribed the first experiment in breeding, and the first recognition of a difference in the races or herds of animals. When he decided to separate from the service of Laban, his father-in-law, and they were about to divide their flocks and herds, Jacob choose for his portion all the speckled and spotted among the cattle, and all the brown among the sheep, and he instituted certain experiments, recorded in history, which had the effect to cause the young of the cattle to come spotted and ring-streaked, and the young lambs with speckled and brown faces and legs, very much to his own aggrandizement, and very much to the dissatisfaction of Laban, his employer and father-in-law. Jacob's policy demonstrates one important lesson to all breeders. It establishes the supremacy of art, and shows the ease with which both the color and form can be moulded to the will of man. Whether we can fairly claim for the Southdown sheep this ancient origin, I will not assert positively; but the probabilities of the case seem to point that way.

Coming down to more modern dates, we find that the Southdown sheep of our times originated in England on a long range of chalky hills called the Southdowns. On these hills a certain breed of sheep has been produced for many centuries, in greater perfection than elsewhere. It is only within the last century that they have been brought to their present high standard of perfection. As far back as 1776 they were of small size, and not superior in form to the common sheep of the country. Since that period a course of judicious breeding, pursued by John Ellman, of Sussex, for a period of fifty-five years, greatly increased the value of this breed, and it was done without any admixture of foreign blood. The Southdown is by nature an upland sheep, and belongs to the middle-wooled class. The average weight of the fleece has been increased since 1776 from two to four and even six pounds of clean wool. The Southdown is raised more particularly for its fine mutton, for which quality it takes precedence of all others in the English markets. Its early maturity, its extreme aptitude to lay on flesh, render it particularly valuable for this purpose. It is quiet and docile in its habits, and though a good feeder, shows but little disposition to rove. I do not think my sheep would voluntarily go off the place if the gates were left open all summer.

About the year 1800 the Emperor of Russia paid Mr. Ellman $1,500 for two rams, to try the effect of crossing upon the more northern breeds of sheep. Jonas Webb, of Balraham, Cambridgeshire, England was the most successful follower of Ellman, and carried the breed to a still higher degree of perfection. Choice specimens of Ellman's Southdowns were first imported into the United States by John Hare Powell, of Philadelphia, about the year 1830. Samuel Thorne, of New York, imported the ram Archbishop, from Webb's flock, in 1860. The price paid in England was $1,250. J. C. Taylor, of New Jersey, imported the ram "89," bred by Mr. Webb, in 1861. The price paid was $1,300, being the highest price paid for any ram at the Webb sale in 1861. The other principal importers of Southdowns to this country are Lewis G. Morris, of New York, and R. A. Alexander, of Kentucky. Since the death of Webb, Lord Walsingham seems to be taking the lead as a breeder of Southdowns in England, and the specimens from his flock shown at our centennial exhibition certainly shows that the breed is not retrograding.

The Southdowns, though fine in form and symmetrical in appearance, are very hardy, keeping up their condition on modern pastures, and readily adapting themselves to different localities and different systems of farming. Being so docile, they thrive well, even when kept upon the artificial pastures of our cultivated farms. They will sustain themselves upon occasional short keep, and endure hard or heavy stocking equal to any breed, while their early maturity and a disposition to fatten at any age make them at times ready for market. The ewes are good breeders and excellent mothers, frequently rearing one hundred and twenty to one hundred and thirty lambs to the one hundred ewes. The fleece closely covers the body, and is one of the most valuable of our native wools. It is short in the staple, fine and curling, with spiral ends, and is used for carding purposes.

From the foregoing description of the breed we will now be the better able to judge whether it is best adapted to the soil, climate, and markets of our State. In successful sheep husbandry, at least three conditions are essential:

1. Location and adaption of the farm for the business.
2. Selection of breed to accomplish the objects sought—mutton, wool, or both.
3. Care and skill in the management of the flock.

There are but few farms that cannot be adapted to keeping sheep. If the surface of the ground is not too wet, they will do well almost anywhere. I am willing to admit that there are many farms that will pay a better return for the investment if devoted to dairying or general agriculture. But it is upon these farms which are unsuited to the purposes of grain-raising or dairying that I would urge the claims of sheep husbandry. Steep hill-sides, broken and new land, rocky and stony places, will generally make excellent sheep pastures, and cannot profitably be devoted to anything else. We have much land of this kind which is now producing nothing but weeds and briars, which, if stocked with sheep, would contribute much to the owner's income and the nation's prosperity. The value of sheep as aids to the farmer in subduing weeds and briars is not sufficiently understood or appreciated. While it is true that sheep can be kept profitably upon land that cannot well be devoted to anything else, it is still equally true that upon good land they will pay as well as other stock or crops, if skillfully managed, and with very much less labor to secure it. As the principal object sought to be produced be mutton or wool, the farmer should be governed accordingly in the selection of his breed of sheep. Where land is high, and hay and grain, beef and mutton bring good prices, it will not pay to keep sheep for the purpose of wool-growing alone. On such land and in such locations the value of the carcass must be combined with that of the fleece to make the business at all remunerative or compare favorably with other branches of agriculture. Four years ago I wrote for the State Agricultural Society, calling the attention of the farmers of our State to the importance of sheep husbandry as a branch of agriculture, and presented some considerations why it should be more generally engaged in. As my sentiments upon this subject remain the same now as they were then, and as the same necessity still exists for their expression and circulation, I shall, I trust, be pardoned for a statement of a few of the more important among them. Of late years sheep farming has not been considered profitable by the majority of our farmers, and very many of them have entirely abandoned it and taken to grain-raising, dairy-farming, etc., as being more remunerative. It is only the few who have stuck to and pursued the business in the right manner who have found a profit in it, and I shall endeavor to show how this is to be accomplished. Situated as we are geographically, within convenient access to the two largest cities and best markets in the country, if sheep husbandry cannot be made profitable here, it cannot be so in any part of the country. The time when it was profitable for us to keep sheep for the sake of the wool mainly has gone by, and may perhaps never return. We must have an eye to the value of the flesh as an article of food, as well as the wool for clothing, in order to make a profit by sheep husbandry. Much of the land in our State has become too valuable to raise and keep sheep for the value of the wool only at present prices. We cannot even compete with our more northern States in profitable grain-raising, and much less in wool-growing, where thousands upon thousands of unenclosed acres, afford abundance of luxuriant pasture which may be had for the mere taking. We must now turn our attention to the more finished products of mutton, beef, milk, butter, etc., which are more perishable in their nature, whose chief excellence consists in their freshness, and that will not bear the effects of transportation equally well with the more durable staples of grain and wool.

One way by which many of our farmers have found sheep husbandry to be quite profitable, is in raising early lambs for the New York and Philadelphia markets. The manner in which this has been done, I will briefly describe for the benefit of others. Good, strong, common ewes should be procured in July, if possible, and young and vigorous thoroughbred Southdown bucks should be turned with them immediately after harvest, allowing not over twenty-five ewes to one buck, if a lamb, not over fifty ewes to a yearling ram. By this practice the lambs will ordinarily be dropped between the 15th of December and the middle of January. If the ewes are well fed through the winter, and the lambs have a free and separate access to corn meal as soon as they are old enough to eat, they will, by the middle of March, or when they are three months old, weigh from forty to fifty pounds each, and bring twenty-five cents per pound live weight, or ten to twelve dollars apiece. I have known some of our farmers who had their lambs ready to send off by St. Patrick's day, to realize as high as twelve dollars per head for them. Of course this extreme price does not last long, and is only obtained by a few, but the price does not usually come down below sixteen to eighteen cents per pound, or about eight dollars a head for lambs before the first of June, by which time the crop of lambs should all be marketed. If the price does fall too low to realize a profit by selling to dealers, we still have a remedy, and that is, to sell our own stock direct to the consumers. By retailing his stock in this way, the farmer who lives convenient to a good market, can have all the season to dispose of his stock, killing them as they become fit, and get from eighteen to twenty cents per pound by the quarter, or from eight to ten dollars apiece for his lambs. The profits made by the butchers are entirely too large; I have frequently known them to drive out to a neighboring farm, buy a good, fat lamb that will weigh eighty to one hundred pounds, and sell it out to their customers the next day at twenty cents a pound, thus realizing a profit in two days, equal to what it has taken the farmer five or six months to produce. After the lambs are sold, the ewes will soon fatten, and can be sold for a dollar or so apiece above first cost; and estimating that gain in price, with the value of the fleece and manure to balance the cost and trouble of keeping, the lamb can be reckoned as clear profit. If the ewes are good, it may be best to keep them on; this will depend upon their condition and the rates at which they can be re-placed. If, however, the lambs are dropped later, or kept longer, or sold for less prices than I have named, say five or six dollars each, the profit will be proportionally less, but there will still be a profit equal to the price obtained for the lamb on every ewe that raises one; and it is not strange or unusual for a flock of ewes to average one lamb apiece—some flocks do even better than that. Now, if a profit of from five to ten dollars a head, or averaging seven and a half dollars on each ewe, I think it must be seen that sheep husbandry can be made profitable. The records of my flock of sheep for the past seven years, commencing with 1870, and closing with 1876, shows even better than this. The average number of ewes kept was sixteen. The average amount received from sales of sheep and lambs, was one hundred and seventy dollars, or an average of ten dollars and sixty-two cents per ewe; and this sum is exclusive of amounts received for wool, and for premiums at agricultural fairs. It is true, that I sell the most of my stock to be kept as breeders, but still the prices obtained are not far above what they would command if retailed from the butcher's wagon or stall.

In order to get at the relative profits of sheep husbandry, compared with other branches of agriculture, it will be necessary to consider the subject under different aspects. For this purpose I will next contrast it with dairy farming, as now practiced in many parts of our State. In this inquiry, one of the first questions to be considered and settled, is, how many sheep are equal to one cow, both in amount of capital invested and in amount of provender consumed? So far as first cost is concerned, I shall consider ten sheep as equal to one cow; while in the amount of provender consumed, farmers differ very widely in their estimates—ranging all the way from four to twelve. In regard to this great difference of opinion on this point, I would say that they are all partly right and partly wrong; for a great deal depends, no doubt, upon the kind of sheep kept. I know of no better basis to put this upon than that of live weight. Thus, four sheep, weighing two hundred pounds each, are equal to eight weighing one hundred pounds each; and six sheep weighing one hundred and fifty pounds each, are equal to twelve weighing seventy-five pounds each. And further, four sheep, of two hundred and twenty-five pounds weight, six, of one hundred and fifty pounds, nine, of one hundred pounds, and twelve, of seventy-five—would, each lot, be equal to one ordinary sized cow of nine hundred pounds weight, in the amount of provender consumed. This fact has been sufficiently ascertained by the experiments of scientific men. How often do we see the statement in our agricultural papers and books, that "an animal consumes as food daily a certain percentage of its live weight—three per cent of hay, or its equivalent." Having first determined the average profit per head on the sheep, the next question to be ascertained, is, what is the actual profit on the average cow? The whole amount of money received in a year for the product of a single cow is one thing, and the actual profit thereon is another, and quite a different thing. Some cows will make two hundred pounds of butter, and fatten a calf worth twenty dollars, in a year, while others will not do more than half as well. Assuming the average cow to make one hundred and fifty pounds of butter, and to raise a calf worth fifteen dollars, will be quite high enough. The average wholesale price of butter in the year 1876 was thirty-five cents per pound in the Philadelphia market, which makes fifty-two dollars and fifty cents as the amount received for the butter, and sixty-seven dollars and fifty cents as the whole amount received for the product of the cow. Now, how much of this sum may be fairly reckoned as profit? By very careful estimates and calculations made by the members of the Solebury Farmers' Club, (of which I have the honor of being a member,) twenty-seven cents per pound was fixed upon as the actual cost of making butter throughout the entire year. Now, if this be correct, there will be left but eight cents on the pound as profit, which amounts to twelve dollars on the butter, and adding fifteen dollars for the calf, makes a profit of twenty-seven dollars out of the sixty-seven dollars and fifty cents received during the year. Now, it will only take five ewes, selling their lambs at the low price of five dollars each, to realize a profit nearly equal to this, while I think double that can be done. Estimating six sheep as equal to one cow, and selling the lambs at seven dollars and fifty cents apiece, a profit would be made equal to forty-five dollars' profit per cow; and in order to realize an actual profit of forty-five dollars per cow, her butter, if sold for thirty-five cents per pound, and deducting fifteen dollars for the calf, would have to reach the enormous production of three hundred and seventy-five pounds per annum, or more than a pound per day. This calculation is based upon the profit being eight cents per pound on the butter, amounting, in the aggregate, to thirty dollars. I am aware that in reply to this it will be urged that many farmers do much better with their dairies than I have stated. There is no doubt but that this is true, and I will merely add in this connection, that it is only those who do so much better with their butter than the average, who can ever expect to equal or compete with the successful sheep husbandman. To make dairy farming as successful as sheep husbandry, it seems to me that we shall have to own extra cows, that will make two hundred pounds of butter a year, and obtain not less than forty-five cents a pound for the butter; or if only one hundred and fifty pounds of butter are made per cow, then the butter would have to be sold for sixty cents per pound to realize the same profit, and make it equal to sheep farming, where lambs bring from seven to eight dollars a head—and estimating six sheep to equal one cow. Before leaving this branch of the question, having given my experience with sheep during the past seven years, I will give the results of my experience with cows during the last two years. Thus will the two systems of farming be fairly contrasted.

A Dairy Statement.

Yield of a herd of Jersey and Guernsey cattle, for the Centennial year, 1876. I commenced operations January 1, 1876, with a herd of ten cows—six Jerseys, two Guernseys, and two grades—coming in profit as follows: one in October, 1875, one in December, 1875, two in January, four in March, one in May, and one in August, 1876. One calf was sold in 1875, and one lost in January, 1876, which are not taken into the account, and but eight calves were raised during the year.

Butter Record per Month.

January, 76 pounds; February, 74 pounds; March, 11 pounds; April, 138 pounds; May, 213 pounds; June, 189 pounds; July, 138 pounds; August, 203 pounds; September, 155 pounds; October, 126 pounds; November, 182 pounds; December, 136 pounds. Making a total of 1,740 pounds, averaging 174 pounds per cow. This, at 40 cents per pound for the butter, amounts to $696, or an average of $69 60 per cow for the butter.

Calf Record.

Two bulls sold at the Centennial, at $42 each,	$84 00
One thoroughbred Jersey heifer,	46 00
Two crossbred heifers sold at the Centennial sale at $26,	52 00
Three thoroughbred Jersey heifers retained and valued at $46 each,	138 00
Making the total value of the eight calves,	$320 00
Add to this the amount received for butter,	696 00
Makes a total income for the ten cows,	$1,016 00
Or an average per cow of,	$101 00

In this trial I set out to realize 2,000 pounds of butter, and $1,000 from ten cows. The result shows that I partially failed and partially succceeded; being short on the amount of butter made 260 pounds, or 26 pounds per cow; but gaining $16, or $1 60 per cow over the mark aimed at.

The record for the year just closed, (1877,) is also presented as being better in some respects. I started January 1, 1877, with a dairy of eight cows, viz: four Jerseys, two Guernseys, and two cross breds. The record of butter made per month in 1877, is as follows:

January, 159 pounds; February, 88 pounds; March, 96 pounds; April, 124½ pounds; May, 222½ pounds; June, 200½ pounds; July, 130 pounds; August 166 pounds; September, 120½ pounds; October, 140 pounds; November, 117 pounds; December, 92 pounds; Making a total of 1,656 pounds, and averaging 207 pounds per cow. This, at 35 cents per pound for the butter, amounts to $589 60, or an average of $72 45 per cow for the butter. The calf record for 1877, is as follows:

Two thoroughbred Jersey heifers, sold to go to Kentucky, at $50 each,	$100 00
Two thoroughbred Jersey heifers, retained each, $50,	100 00
One crossbred heifer, calf, sold for,	25 00
One crossbred bull, to butcher, for,	10 00

One thoroughbred Jersey bull calf, unsold and valued at,	25 00
One thoroughbred Jersey heifer,	50 00
Making the total value of the eight calves,	$310 00
Add to this the amount received for the butter,	$579 60
Makes the total income for the eight cows for 1877,	$889 60
Or an average per cow of,	111 20

The increase in the yield of 1877 over 1876 is due mainly to a better season for pasture, and partly to better feeding and care of the cows. In order to have these statements of dairy yields have a bearing upon the question of sheep husbandry before us, we must contrast them with the sheep records, kept upon the same farm and at the same time. I can not take from the sheep records the averages for the two years of 1876 and 1877, because the stock on hand had accumulated and were sold out at my Centennial sale, would give to the two years an undue advantage. I therefore give the average of seven years on sheep and the average of two years on cows:

Average receipts from sixteen sheep per year,	$170 00
Average receipts for wool,	32 00
Making a total, for sixteen sheep, of	$202 00
Or an average per sheep,	$12 60

We must next endeavor to get at the profit made from the cows.

In 1876, 1,740 pounds of butter at 13c (40-29-13) profit,	$226 20
In 1877, 1,656 pounds of butter at 8c (35-27-8) profit.	132 48
Making a total profit on the butter in the two years, of	$358 68
Or an average on nine cows, per cow,	39 86⅓
Adding the whole amount of value of sixteen calves raised,	$630 00
Or an average for nine cows, per cow, in two years,	35 00
Makes a total average per cow, for butter and calves,	$74 25

The profit per head on sheep we have found to be $12 60. Allowing six sheep to equal one cow, we have $75 60 as being the amount of profit per cow that should be realized to make dairy farming as remunerative as sheep husbandry. But under the most favorable circumstances and calculations we find that it falls 75 cents short of this. Or in other words, the cow must make at least two hundred pounds of butter, selling at 37½ cents per pound and sell a calf each year for $35 to make dairy farming equally profitable with sheep husbandry, allowing six sheep equal to one cow. This calculation supposes the value of the calf to pay for the extra labor of making the butter. From the results of my own experience, therefore, I come to this conclusion, that dairy farming with cows making two hundred pounds of butter per annum, and raising a calf each year worth $35, is about equivalent to keeping Southdown sheep at present prices for the products of the dairy and of flock.

Contrasted with Grain Raising.

It is hardly necessary to compare sheep husbandry with grain raising in Pennsylvania. It is now, I think, the general opinion that raising grain to sell in the market, has ceased to be profitable here. As has been already expressed, in this respect we cannot compete with the West. We must send our grain to market in the shape of finished products of pork, beef, butter, and mutton. By so doing we will partially avoid the low prices, save expenses in transportation, and at the same time greatly enrich our farms. There is a fact worthy of mention in this connection, and that is, that where sheep are kept, and the manure made by them applied to the wheat crop, the yield per acre is greatly increased. I have seen it stated that in England, on farms where sheep husbandry is extensively practiced, the average yield of wheat was fifteen bushels per acre greater than on farms where sheep were not kept. So generally is this fact recognized in England that many landlords in that country have it stipulated in the articles of agreement with their tenants that a specified number of sheep are to be kept upon the lands. The testimony of many of the leading agriculturists in this country is also in support of this fact. The old prejudice that sheep were "death to the crops and poison to the soil," does not appear to be sustained by evidence. On the contrary, we now frequently meet the statement that sheep are necessary to increase and maintain the fertility of the soil. There is still one other argument in favor of keeping sheep, and that is the labor question. The difficulty in all, and the absolute impossibility in many cases securing adequate help, renders dairy farming impossible for many, and exceedingly difficult for all who are engaged in it. I think it will be safe to say that sheep farming can be carried on with one fourth the amount of labor necessary to carry on dairy farming; and if the profits realized are not equal those who get from seventy-five cents to one dollar a pound for their "gilt-edge butter," there is less labor required to secure those profits.

General Considerations.

If from the foregoing considerations it appears that sheep husbandry is or can be made profitable, I would advise that all do not rush headlong into the business at once. Such a course would unsettle trade and be productive of no good results. The tendency of the American people is to extremes in almost everything. We overdo almost everything we undertake. And it is this over-production that causes such low prices. To those who have sheep on their farms I would say, retain them; and to those who have none I would say, procure and try a few, and see if you cannot find a profit in keeping them. A few sheep can be advantageously kept upon almost any farm. There is no land too rich for sheep husbandry, and there is none so poor in our State, that I have seen, but what will support a few sheep, and be improved in condition by it. And we have also much land in the State that is better adapted to sheep husbandry than to the purposes to which it is now devoted. Sheep will feed upon some things that other stock will not touch. They will entirely eradicate some kind of weeds, and what they do consume will hardly be missed at the end of the year, unless kept in too large numbers. But what I would especially recommend is the adoption and maintenance of a system of mixed husbandry. By so doing the farmers always has something to sell every year that will bring a good price. If one article is low and does not pay, another which he has will bring a good price and be quite profitable. Whereas, if he risks all upon one crop or production, he will, in most cases, either make or lose heavily, and the chance to make is only one, in proportion to the whole number of crops raised or produced. The more chances the farmer has, as a general rule, the better for him. His chances with hay, grain, poultry, pork, beef, butter, wool, and mutton, all to sell, even in smaller quantities, is better than with any one of them in much greater quanity.

Experience in Breeding.

I commenced farming and breeding sheep twenty-four years ago. The first sheep I purchased were Leicesters, or Bakewells, as they are still called by some on account of Mr. Bakewell having, by judicious breeding, succeeded in bringing up the breed to a high state of perfection. I was pleased with their appearance, their clean white faces, their broad, straight backs, and square forms, and long wool, resembling minature loads of hay moving about the fields. At that time I was desirous of making some great improvements in sheep breeding that would be the means of distinguishing myself, as Mr. Bakewell and Mr. Ellman had done. I therefore resolved to establish a new breed of sheep myself, and accordingly procured a thoroughbred Southdown buck to cross with my Leicester ewes. I have now in my library the American Shepherd, by L. A. Morrell. Upon a blank leaf opposite the title page in this book is written, "Awarded to Eastburn Reeder, by the Bucks County Agricultural Society, as a premium for a Southdown buck and a Leicester ewe, September 24, 1856." The first cross was a success. The lambs that followed the next season pleased me greatly. I admired, as Jacob did of old, their speckled faces, smooth forms, and rapid growth. I took them to the fair the following season, and obtained the first premium upon them, as the largest and best lambs on exhibition. There was success and glory enough for one year; a new breed of sheep had been created—new at least to me, for I had never seen or heard as such sheep as mine. Discarding the Southdown buck (for then I thought I was done with him), I resolved to proceed at once with my new breed, selecting the best buck lamb of the lot for my own use, and selling the others. The results of the second year did not please me nearly so well. I now had the two breeds again. I had the dark faces resembling the pure bred Southdowns, and I likewise had lambs in my flock with faces as pure and white as those of the original Leicester ewes. I tried this plan of breeding with varying success for ten years, and in all that time I never had a flock of lambs equal to those produced by the first cross. I was ignorant then of the names of Ellman and Bakewell, and knew nothing of their secrets of success. Had I continued to use a thoroughbred buck every year, thus bringing my flock up nearer and nearer each succeeding year to the thoroughbred standard, there is no doubt in my mind now, but that I would have succeeded better. The true principle of breeding, as I learned by experience, and have since read in the writings of others, is to keep thoroughbred males for sires, and to breed your females up to the purer blood of the higher and nobler race. Another system of breeding will be cross ways or at random, always with uncertain results, and in a great majority of cases will surely result in actually running the stock down hill. This, then, is the first great lesson I desire to impress upon the mind of the young farmer about to commence the important business of breeding and raising sheep. The improvements made by Ellman and Bakewell in their flocks were accomplished without the admixture of any foreign blood. The best of both sexes were retained for breeders, and thus their good qualities were perpetuated and intensified, while the defective qualities were correspondingly avoided and overcome.

Breeding Southdowns.

During the last twelve years (or since 1866,) I have been breeding Southdowns, the stock being first carefully selected from some of the best flocks in the country; believing after twelve years' trial of other herds, that the Southdowns are the best suited to my particular locality. In 1870, I began keeping a regular register, recording pedigrees, and keeping an account of sales. My lambs have averaged me ten dollars apiece, and the wool two dollars per head for each ewe. I began the flock in 1866, with one buck and two ewes; two years later two more ewes were purchased, and in two years more two more ewes were added to the flock by purchase, making six in all purchased, and these with six ewe lambs raised and retained as as breeders, made a flock of twelve ewes at the beginning of 1870. During the seven years elapsing from the beginning of 1870 to the close of 1876, the record shows the following important points, viz:

1. The lowest number of ewes kept in any one year was twelve. The highest number of ewes kept in any one year was eighteen. The average number of ewes kept for the seven years was sixteen.

2. The total number of lambs raised in the seven years was one hundred and five, being an average of fifteen per year.

3. The total number of animals sold in the seven years was ninety-one, being an average of thirteen per year.

4. The whole amount received for the ninety-one sheep and lambs sold was $1,190, being an average of $170 per year, and of a trifle over $13 per head.

5. The whole amount received for wool in seven years was $225 68, which for four hundred and ninety pounds sold, was an average of seventy pounds per year, at forty-six cents, or $32 24.

6. The record also shows that during the seven years, received as premiums $700, being an average of $100 per year.

This last item of receipts does not come legitimately under the head of income. Without counting the premiums the average yearly receipts from the flock were $202 24, counting the premiums they will be $100 higher.

Stocking.

I think I can keep one sheep and one cow to every acre on a given amount of pasture, just as well as to keep the cow alone. I know that I can keep ten ewes through the winter on what food will be consumed by a good, healthy, fresh cow. In regard to the alleged injurious effects of keeping sheep and dairy cows in the same pasture, as affirmed by some, I must state that I have never observed them. And even if there were any injurious effects resulting from this practice, it would be confined to the short space of time intervening between first turning the cows to pasture and harvest, say from the middle of May to the middle of July, (two months.) After that time the sheep will prefer to cling to the old pasture, while the cows will be ever seeking and longing for the new. It has been my practice for the past ten years to select annually, at least, three of the best ewe lambs, to be retained in the flock as breeders, and weeding out annually as many older and inferior animals. By so doing, if there is any improvement made in breeding, it will be retained and prepetuated in the flock. It has likewise been my practice to change bucks, at least, once in three years.

Compared with Hay or Grain Raising.

On land worth one hundred dollars per acre, it will not pay to keep sheep for wool growing, when hay is worth twenty dollars a ton, or corn sixty cents a bushel. The relative gross receipts per acre would stand in something like this proportion:

One acre of land cutting two tons of hay, worth, ...	$40 00
One acre of land yielding fifty bushels of corn, worth, ...	30 00
One acre of land pasturing ten sheep yielding wool, worth, ...	20 00

But if each of these ten ewes produces a lamb worth five dollars, then the gross receipts per acre will be swelled above that received from either hay or grain. It is no uncommon thing for the farmer to purchase twenty ewes at five dollars' apiece, making $100 for the lot, and before the expiration of the year to sell forty dollars' worth of wool, and lambs amounting to $100 more, making one hundred per cent. on the investment, and have the original stock on hand, worth as much or more than at the time of starting. Of course this is not all to be set down as profit. Neither is the whole amount received for a crop of hay or grain to be considered as profit. How many farmers can tell exactly how much it costs them to produce a bushel of corn or a pound of butter? In determining the actual profit on any crop, there are many items of debit and credit to be counted before the true result is reached. In sheep husbandry the credits come in under the heads of wool, lambs, mutton, manure, improvement of the farm, etc., etc., while the principal charges are for provender consumed, and for labor in their care.

Concerning Dogs.

I cannot close this essay without alluding to that greatest of all pests to the shepherd—worthless dogs. In so doing I have no desire to trespass upon the ground of my colleagues. Living, as I do, near a village where a superabundance of these curs are kept, I know of and can testify against this nuisance. During a period of twenty-four years I have never dared to risk my sheep in the fields a single night. I tried it once only, and they were attacked before bedtime. The old safeguard for me is to fold them in a yard, at night, that is secure against dogs. During the day, when they must be on the fields, the best protections I know of are: First, provide the sheep plentifully with bells to sound the alarm; second, let them run and pasture with the cattle; third, never fasten them in the fields, but always have the bars down so that they can flee home on the approach of danger. By strictly following these rules I have never lost but one sheep by dogs, and that was the one attacked and bitten the only evening they were ever left out. This is an evil we should not be permitted to longer endure. The Legislature should, at this session, enact such a law as will give to us the protection we so much need, and which I think we so well deserve.

I trust I have now sufficiently answered the question, what is the best breed of sheep for profit? expressing my opinion in favor of the Southdowns, and it only remains for me to append my reason why: First, they are more hardy and better adapted to our soil and climate; second, they mature earlier, being always ready for market after three months old; third, the quality of the mutton is superior to that of all other breeds; fourth, they are more quiet in their disposition and less inclined to rove; fifth, they will produce more meat on a given amount of food consumed.

Mr. J. C. Morris, of Susquehanna. Don't you find that for the last few years the Southdowns are very much changed; that there is better wool, and that the color of the fleece is different? At first the fleece was quite dark, and now the breed leads to more of a brown.

Mr. REEDER. I have been laboring to get the slate and buff color, as much as I could; and, in selecting, to take the heaviest wool Southdown I could find. I found him on the farm of George H. Brown, in New York. He is now on the Victory farm, in Kansas.

Mr. MORRIS. In the time of Jonas Webb, there is no doubt that he did send over the best and finest sheep. Now they have got them up to four or five pounds of wool. Haven't they mixed them with some other stock?

Mr. REEDER. I do not know.

Mr. MORRIS. Now about your experiment. In speaking of pure breeding, if you had gone on with the breeding as you first started, you would have got a fine lot of sheep. Take the Shropshiredown—the finest in the market now—that has been crossed upon the Southdown with the Lancashire. The latter gives you more wool. They are much larger than other varieties. The wool will be a foot long, and their weight, the first year, will be a hundred and on up to two hundred and fifty pounds. But the wool is more like hair. It is very coarse. Take the Lancashire, and breed with the Southdown upon the Lancashire. They form what are called the Shropshire. The Oxfordshire sheep is another cross. They were imported, probably, into this State from Delaware, although a few came into the State of New York.

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Now, gentlemen, speaking to those of you who have sons you wish to make farmers of, I wish to refer to a point, and it is the idea of keeping your boys in the field at work. You can work him, and show him nothing. If you will undertake to make him a first rate farmer and breeder, you can do it with a slight degree of trouble. When I was a little boy, my father took an interest in showing me the science of breeding, and we first commenced with the common rabbit. I then went up to the lop-eared rabbit. He commenced by showing how he could breed any color of the rainbow with the little rabbit. Then he wanted me to breed with certain colors; then with a butterfly upon the forehead. In this way it was a beautiful science. After the rabbits, he put me upon sheep. He wanted me to breed those with different points. Then he went to cattle, and then even to horses. There was very little money expended in those articles. Gratify your son, and talk to him as to a man, and you can keep him at home and make him a capital good farmer. Speaking about the French rabbit, it is not only the teaching of the boys, but they are profitable There is nothing you can put on the table that is a finer meat than the rabbit. It is much larger than the common rabbit that you have around here, and the meat is very delicate. If you fail to have the right points in breeding, fatten them, and the meat is finer than the chicken. There is no loss. Then the French rabbit will bring a fancy price.

A MEMBER. Will they not skin the trees?

Mr. MORRIS. You must not let them run. A box about two feet square is large enough for one. The doe will thrive in a small box, perhaps a foot wide and two feet long, and there she will breed her young. The box is never left, except for a few moments. I have bred them with ears twenty-two inches long from tip to tip. It was done to show, as a boy, that I could breed them to this length. Then it is so quickly done. In one year you have all these experiments tried.

The discussion having been closed, the President announced, as the next business in order, an essay on

THE EFFECT OF PRESENT DOG LAWS, WITH SUGGESTIONS FOR THEIR IMPROVEMENT.

By J. P. BARNES, *Member from Lehigh.*

In treating the topic allotted for my essay, to wit: "Effect of the Present Dog Laws, and Suggestions for Their Improvement," I trust you will consider it no inappropriate digression to make a brief reference to that useful animal, the sheep, for whose benefit these laws were framed, the young of which, from the earliest history of the world, has been recognized as the symbol of innocence and purity; the fleece and flesh of which have contributed so largely to the comfort, protection, and nourishment of man, and the keeping of them has engaged the attention of the greatest, best, and wisest men known in sacred or profane history. Looking back to a period coeval with the creation of the human race, we find that Abel, the second and better son of Adam, was a keeper of sheep, while Cain, his older brother, was a tiller of the ground. Here we learn that tilling the soil and keeping sheep were the two leading occupations of man, after he was driven, for his disobedience, in shame and sorrow, from the Garden of Eden. Sheep were the earliest class of animals, according to biblical information, subject to domestication by man, and that, in the earliest ages, as in some countries now, they formed an important part of his earthly possessions. In the time of King Solomon, upwards of two thousand years after the death of Abel, sheep husbandry had attained immense proportions. The requirements of his household were one hundred sheep daily—a flock of thirty-six thousand being needful to supply his table for one year. Job had fourteen thousand sheep; King Hezekiah gave to the congregation seven thousand sheep, and the princess ten thousand. The sons of Reuben took from the Hagarites two hundred and fifty thousand sheep, which may have been a small proportion of their actual herds. The success of the shepherd boy David, in the conflict with the lion and the bear, the ferocious animals that had created havoc in his flock, a preparation under divine guidance for the future triumph of the young champion of Israel over the giant of Gath. Showing that it was necessary in those days that these animals, so defenseless by nature and domestication, should be protected from their voracious enemies by the hand of man, it is necessary now, when personal courage is so rare a quality that human laws should operate to diminish what in these days and in this region are the greatest enemies of sheep—the dogs—which are permitted to run at large, destroying, with relentless ferocity, the flocks they should defend and protect. Coming nearer to the line of my subject, I refer to the importance of the business of wool growing, from the fact that the number of sheep in the United States aggregate upwards of sixty millions; how many of these should be apportioned to Pennsylvania I have not the data from which to determine. In some portions of the State wool growing is a business of considerable extent, and in the early part of the present century the attention of law makers was directed to the necessity of statutory provisions for the protection of sheep against the ravages of dogs, and on the 22d of March, 1809, a dog act, applying to the counties of Bucks, Chester, Montgomery, and Delaware, was passed, which bears the stamp of practical wisdom, and, no doubt, operated very favorably in the region to which it was limited. I have been prompted to draft a synopsis of the leading parts of this law, and trust it may be of sufficient interest, profitably, to occupy a portion of the time and space assigned to this paper.

The provisions are as follows:

First. It requires the commissioners to cause accurate returns to be made annually by the assessors of the several townships, of all dogs upwards of one month of age, particularly noting the number owned or possessed by each person and kept about any one house, and when the said commissioners shall so have ascertained the number of dogs aforesaid, they shall levy and cause to be collected annually from every person or persons owning and possessing one dog, twenty-five cents, and for every second dog kept about the same house one dollar, and every additional dog, two dollars, which is to be collected by the collectors of the several townships, at the same time and in the same manner the county rates are levied and collected.

Second. It shall be the duty of the county treasurer to keep a separate account of the money arising from dogs, and the said money to be appropriated as a fund for remunerating the inhabitants of the said counties respectively for any loss they shall sustain by sheep being destroyed by a dog or dogs.

Third, provides: That the person elected to audit and settle the accounts of the several townships, shall be appointed appraisers of the damage done by dogs within their respective townships, with full power and authority to examine any person that shall appear before them.

Fourth, provides: For straying dogs, and when the owner thereof fails to return such a dog, double the amount of tax shall be collected, and any dog not returned shall be deemed to have no owner, and may be lawfully killed by any person seeing him run at large.

Fifth, provides: That if any dog shall be seen worrying sheep, it shall be lawful for any person seeing the same to kill such a dog, or if any dog shall have been known to worry sheep, and information thereof be given to the owner of such a dog, if he does not kill or cause him to be killed, he shall make full compensation for all damages done by said dog; and any person seeing said dog running at large may lawfully kill him. This section fully reaches the punishment of the dog trespassing and its owner if necessary.

Sixth, provides: That the surplus money remaining in the treasury arising from the tax on dogs above what is needed for the losses sustained by sheep being destroyed, shall be applied in purchasing a number of Merino rams and ewes of the full blood, which shall be placed in the most convenient places in the said counties for the benefit of the farmers, and every farmer shall have liberty to send three ewes to some one ram in said county, to continue with him for one week, free of all expenses, except a reasonable compensation for pasturage, and it provides further to dispose of some of the offspring of said full blooded stock, and the money so realized, in addition to the surplus dog tax fund, to be applied in procuring some other approved breed of sheep, and for the importation from Europe or elsewhere, the most approved breed of cattle, to be placed in the respective counties for the benefit of the farmers in the same manner as is provided for sheep.

There are a few other provisions in this act of not very general importance, and I would refer those desiring further information to the act.

Other local acts were subsequently passed in the years 1813, 1831, 1851, 1854 and 1873, the latter act applying only to Wyoming county. The act of 1809 taking into consideration the infancy of our government is most complete in its details, and extremely liberal in the disposition of its surplus funds, more so than any of the several laws subsequently passed.

The law of 1873 was evidently framed on the basis of that of 1809. The clause in the older law appropriating the surplus funds to the means of improving the breed of cattle, was an excellent one in its day, but in obedience to the demands of the times the law of 1873 turned these funds into another channel, to wit: the common school funds, the necessity for improving cattle being no longer so pressing as the education of the rising generation.

The new law very properly makes dogs personal property with all the implied responsibilities, and it is to be hoped that the old adge, "every dog has his day," will find a frequent application when the less euphonious one, "every dog must have his owner," shall be practical reality. Some other changes of minor importance were made to which it is not necessary here to allude.

In reference to the suggestion of improvements in dog laws I have nothing to advance, except to recommend that the special law of 1809 and 1873 be changed to suit this age, and made general, confident that in no locality would it operate to any disadvantage, but on the contrary would have a tendency to diminish a class of animals that are productive of little else than hydrophobia, and save from worriment and death another class, the useful, gentle, and defenseless sheep which has been one of the greatest temporal blessings ever conferred by heaven on man.

Mr. **REEDER.** The trouble, it appears to me, with the existing law is this: that where the owner of the dog is not worth anything, you can get nothing. Now the process to make the dog law of any value, will be to place a high tax upon dogs. Then if the tax is not paid, let the dog be killed. That will thin them out very much. Then let the tax be a fund which will virtually insure our flocks, and help pay our losses.

Hon. **JOHN P. EDGE**, of Chester. There is on the calendar of the House at this time a bill on the subject, very carefully prepared from existing laws and bills offered in the House for the last three years, which covers this whole question very comprehensively and very effectively. It is very similar to the law the gentleman has somewhat elaborated upon. It provides that the surplus in the county treasurer's hands at the end of any fiscal year shall be covered into the treasury of the school district from which the money was derived in the ratio it was received by the treasurer from the different districts, making it equitable; and I have no doubt at all that it will pass the House. It is to be a general law.

Mr. **REEDER.** Does it propose to pay for the sheep killed, out of the money received from the tax on dogs?

Mr. **EDGE.** Yes, sir. The first dog is taxed one dollar; and for two dogs, two dollars for the second dog; and if the tax payer keeps a female dog he is taxed five dollars. There was some little difficulty to comply with the new constitution, making the law apply to different subjects, and this we get over by making it apply to different classes.

Mr. **MORRIS.** I think it is to high for our objects. The bill may ask too much. I am a lover of the dog; there is no doubt about that, because I have had some dogs that I believed knew more than a good many men. But I do not like curs or mongrels of any kind.

Hon. **J. P. EDGE.** We have the backing of the sportsmen's club for the right to tax, relative to that bill.

Mr. **MORRIS.** We farmers like a good dog.

Mr. **EDGE.** Yes, and can pay a dollar or two dollars for one.

Mr. **MORRIS.** Our county law is a dollar, a dollar and a half, and two dollars, and that goes into the school fund.

Mr. EDGE. The House refused to strike out or decrease. They passed the amendment on second reading, raising the rate to the figures specified.

Mr. KELLER, of Schuylkill county. I hope the law will be passed. If we have a sportsmen's club to adopt it at the start, I am afraid we have sportsmen, not in that club, who will oppose it. I am afraid when it comes up finally that they will win.

Prof. D. WILSON, of Juniata county. I have heard it said by men residing in counties where this law is operative, that it results in fraud. Men become careless with their flocks, allow them to be exposed, and come in with a large bill of damages. I do not know how it operates, but I think any man who loves a dog, will be willing to pay a dollar tax for him. And it will raise a considerable amount of revenue. If he wants to keep two dogs, he will be willing to pay for them ; but I think with Mr. Morris, it may be to high. Not only the men of the hunting regions, but I am very much afraid some of the representatives will be scared. I think it would be better to take a moderate tax, though I believe farmers are not afraid of any taxes, provided they have good laws in return. But there are a great many who keep dogs, who will not be able to pay any tax; for whom it would be better to keep a hog than a dog. Do not make the tax too high.

Another thing in regard to the use of the tax money. Let the surplus go to keeping a good buck and a good ewe for the benefit of the community.

Mr. REEDER. Will the gentleman from Chester (Mr. Edge) state how the dog is to be assessed?

Mr. EDGE. The dog is supposed to be owned on the property ; but if not, and there is no proof of ownership, the dog that has no owner has no protection. Any one can destroy him. A dog found in an inclosure where domestic animals are kept, unless in company of his owner, may be killed. There is ample provisions for the protection of sheep. It is simply the law of 1809, only more elaborate.

Mr. BEEBE, of Venango county. Mr. Wilson seems to think this ample protection will be an objectionable feature. So far as we are concerned, we would not give a cent for it without it. The want of it precludes the keeping of sheep to any extent whatever, and the few who do, after trying it once or twice, give up the experiment entirely. On account of the keeping of dogs, this special branch of industry is precluded in our county for want of something like this.

Prof. HAMILTON, of Centre county. Has any gentleman tried the plan of meeting dogs with dogs? It is the custom in Texas and Mexico, and in Spain, to take some of the Spanish shepherd dogs for this purpose. Any one of them is a match for a wolf. When quite young, they put them with a ewe in a pen, and after she has become accostomed to them, they are folded with her at night. Of course they are afterwards folded with the sheep at night. At first the sheep are frightened, but it does not last. The dogs are exceedingly fierce, but like sheep, and are willing to defend them either from wolves or other dogs. They are naturally shepherd dogs, and several stories are told of their gentleness to sheep, and their devotion. The question would be whether it would pay in Pennsylvania to import some of the Spanish shepherd dogs, and allow them to go with our sheep. Then in case of difficulty, most of the ordinary curs would be torn to pieces in a short time. I would ask whether our sheep raisers have not tried them?

Mr. KELLER, of Schuylkill county. Would not these dogs be likely to abandon the sheep?

Mr. HAMILTON. No, sir.

Mr. WISE, of Greene county. I have learned not to trust any dog with sheep, after having resorted to every effort to keep dogs from injuring them. That wolfish proclivity will take possession of him sometimes, no matter how well you feed or care for him. I am in favor of protecting the sheep; but the great trouble is to get relief. I contend that there is no compensation for a flock of sheep worried by dogs. I do not allude to the sheep killed, but those not killed. You may keep those animals for years after, and they will not fully recover. Under these circumstances, our game clubs are coming in, and asking that their dogs shall be taxed: in order to make them property. Then, as to the sportsmen, you dare not shoot his dog. But if I understand your dog law of to-day, I can shoot your dog in your yard, if I believe he has killed my sheep; and you can only bring suit for endangering the family. If there is a tax on dogs, unless the law also requires the dogs to be muzzled, they can destroy the sheep. If you have a flock worth thousands of dollars, and a dog kills one, he has ruined your flock. You may as well sell them. But you cannot get paid for them under the law; you can be compensated for only one sheep. I have lost dozens. The dog is not trustful. Although he may do some things, you can get along about as well without him.

Mr. MORRIS. Did you ever own a thorough-bred shepherd dog?

Mr. WISE. They are the very ones that, unless taken care of, will naturally take to sheep. They like mutton. If you take and educate them, they may succeed.

Mr. MORRIS. I have brought up sheep ever since I was a little boy, because we have had six hundred to nine hundred since I was born; and I never yet have seen a shepherd dog that lost or worried sheep. I never lost a sheep, until within the last six months. During that time I have lost two. Where you find a natural bred shepherd dog, it is just as natural for him to take care of sheep as it is for you.

Mr. BEEBE, of Venango county. Will he take care of sheep?

Mr. MORRIS. Yes, sir. He will fight like a tiger for them. I have known this to be so time and time again. I have got a dog to-day that I would rather have than any sixteen year old boy I ever saw.

Mr. JAMES YOUNG, of Dauphin. I have a few sheep and two shepherd dogs, and I have no trouble with the latter. I never had one of them attack a sheep in a single instance. They are thorough bred, and are excellent dogs both for sheep and cattle.

Mr. WISE. How about the sheep? Do they like the dogs?

Mr. YOUNG. Yes, sir. They mingle with them in the same yard day in and day out. They are turned out every day during the summer.

Mr. WISE. They were raised together with the lambs?

Mr. YOUNG. Yes, sir.

Mr. EDGE. And well fed?

Mr. YOUNG. Yes, sir. Since I have had them, I have not had a single thing taken from my barn. In our place we tax the dogs for borough purposes one dollar a head, and we have a great time getting it. By the time we pass this bill, the question arises in my mind, will we not have a still heavier tax than we ought to bear, besides the creation of a very ugly feeling towards the farming community? For instance, we have in our community persons who cannot keep themselves, and yet have two or more dogs. They will be among the first to entertain this ugly feeling.

Mr. J. P. EDGE. That is just where this advantage comes in, making a joint law, whereby the money goes into the county treasury. Persons in town have dogs, but no sheep; and consequently they do not want to compensate for the destruction of the sheep. But by this arrangement, the money going into the common fund, they are made to pay their proportion of the losses occurring around the town; whereas, if there is any surplus, by another provision of the law, it is divided, and the town gets back into its treasury its share of the surplus. These dogs that live in town really do the business in this matter.

Mr. **WILSON**, of Juniata. It is admitted that the shepherd dog will take care of your own sheep, and will not injure them at all; but I am afraid to trust him with the sheep of others. I am really afraid to let him go even after others' cattle. Another thing: you look at the teeth of the dog, and the structure of his mouth, (though we know his habits,) they are really those of a domesticated wolf. It is really hard to believe that the dog, even the shepherd dog, is faithful to sheep, when you let him go into strange places.

Mr. **WISE**. If a dog goes away from home, it is not improbable that he may go in after the neighbor's sheep.

Prof. **HAMILTON**, of Centre county. If the dog is raised with the sheep he is not likely to injure them, I think. Instances are given in which the owner went away, and where the circumstances were such that the dog was not fed, he starved with the sheep, and was found dead in the road along with them. These Scotch collies I do not talk of in this connection. They are used at times to bring or drive the sheep, but not for living with them. But these dogs live with them always; they never leave. I think our salvation is to fight dogs with dogs, and to get the real Spanish, and gradually you can tear the sheep destroying animals to pieces.

Mr. **WILSON**, of Juniata. Tigers and lions and the most savage beasts may be tamed, but by taming them you do not change their nature. Now the shepherd dog is a dog. Your dog will almost invariably take care of your sheep; but at the same time, if you leave him with other sheep, his woolfish nature will return.

Mr. **BEEBE**, of Venango. In reply to Prof. Hamilton, what he said is no doubt very true. But I saw a shepherd dog that was valued very highly last summer passing down street, and one of the pure bull dogs attacked and killed him in five minutes—before he could get away from him.

Prof. **HAMILTON**. He was not a Spanish shepherd dog. Hundreds and thousands of times through the lower districts of Spain the sheep are driven to the northern districts, where the wolves are abundant, and the only protection is these Spanish Shepherd dogs; and instances are numerous to show the efficiency of these dogs, and their ability to kill a wolf easily.

Mr. **WISE**, of Greene. I have a very excellent neighbor, who sent over to Washington county to somebody there, to recommend to him a thoroughbred shepherd dog. The old gentleman was a straight-forward neighbor, and the dog he bought was well trained; and he told me time and again what his dog would do. How well he would take care of his flock. I never, in any case, interrupted his opinions. I lived one mile from him, and that dog came and cost me $1,000. In a short time the neighbor came and caught him at the destructive work. And this dog was posted as a thoroughbred shepherd.

Mr. W. G. **MOORE**, of Berks. Coming back to the bill before the house, the owners of the worthless curs are the poorer class of people. We have great difficulty to collect a personal tax of twenty-five cents. How are you to get over the provision to collect the tax on dogs?

Mr. J. P. **EDGE**. We cannot make any provisions, except to destroy the dogs. If the owner refuses to return the dog for taxes, the dog is left to be killed on the order of two or three citizens, I think.

The **PRESIDENT**, Governor Hartranft. Do not let him vote, unless he pays tax on his dog.

Mr. **BULLARD**. The law of 1809, if passed as a general law, and enforced, would do remarkably well.

In regard to this tax on dogs, if men are unable to pay a tax, they ought not to pay a tax on the curs especially. If any person is able to keep a good dog, he is able to pay tax on him. A good law would diminish the number of curs to a great extent, and benefit those sections of country where sheep are raised.

The law that I referred to provides that the farmer cannot collect as much as he pleases; but the damage is estimated by persons who are selected for that purpose. I should like to see this law passed. It is carefully compiled from the laws to 1872.

JOHN B. SMITH of Luzerne. I would like to have an amendment put in, that if the owner does not pay his tax the second time the law requires him to do so, that the officers of the law shall take the dog off and kill him.

The **SECRETARY**. In five years the sheep breeders of Ohio lost two hundred and three thousand eight hundred and twenty-four sheep, killed by dogs, and one hundred and twenty-seven thousand four hundred and eighteen injured. Making a total loss of $558,733, an average annual loss of forty thousand seven hundred and twenty-five killed, and twenty-five thousand four hundred and eighty-four injured, and an average annual loss of $111,745. If our Pennsylvania sheep breeders and owners, suffer in the same proportion, their annual loss will be forty thousand seven hundred and sixty-four killed, and twenty-five thousand four hundred and eighty-three injured, at a loss of $46,627.

H. M. **ENGLE**, of Lancaster. I believe that all the dogs in creation are worth comparatively very little. I had a dog once of a supposed valuable breed, but I am glad now that he is gone. We ought to be educated up to the sentiment of having good dog laws, and the use of only those of valuable breeds. I think the sentiment should be cultivated, not to love our dogs so much; especially the large number of worthless curs, ninety-nine out of every hundred of which ought to be swept out of existence. Anything that can be done in Pennsylvania to put out of existence this number, I think ought to be greatly encouraged.

Mr. **KURTZ**, of Lancaster. I have had dogs I would not take hundreds of dollars for, and dogs that I could trust better than a watchman. I had a dog in my tan-yard that, while he was there, I would defy anybody to enter the place. If a person should come there to steal anything, he would have to go away without any booty. I would not take this dog for the best person that could be found between sixteen and twenty years of age. We tax our dogs; but there are parties there that have dogs who do not pay their taxes. Our law is that if you do not pay your tax, the man who collects is authorized to shoot the dogs. He gets just as much for shooting a dog as he does on the tax—fifty cents either way. In that way we get these dogs exterminated; but I would like to see a man shoot some men's dogs, unless authorized. I would not like to do it, for it would be dangerous to my house and barn the next night. It is best to have a regular collector.

The **SECRETARY**. It seems to me, Mr. President, that the questions of the sheep fearing the dogs or the dogs injuring the sheep are merely one of association and breeding. If they are brought up together, there need be no trouble on these points, provided the breed of dogs is all right. In California, I have seen flocks of several thousand all under the care of five or six dogs, and any attempt on the part of one of our members to carry off a sheep would probably cause a vacancy in the Board.

On the appearance of danger from wolves or bears, these dogs will "round the flock up," and bite every sheep standing with his head out, until he turns tail to the danger. Then they act upon the defensive against all intruders. They sleep by turns; but at the least appearance of danger, on a peculiar signal from one of their number, they are all on the *qui vive*, and ready for action. The shepherds there have no trouble from the flock dogs injuring sheep, nor do they lose any from other dogs. With four or five of these dogs, our Pennsylvania flock master might laugh at dogs and dog laws.

In the working of our local or township laws, a serious trouble arises when the farm or field is in two townships. The question is then raised as to which township shall pay for the sheep. When the law is made applicable to counties, the same difficulty is met with when the field is in two counties, one of which may have no dog law.

The suggestion that the sheep should always be guarded at night is a good one; but does not entirely obviate the difficulty. My only losses from dogs among sheep have been in broad daylight, when it was necessary that the sheep should be in the field. In one case, the lost sheep was killed in the front yard, and so was the dog.

I would offer, for information, the following law, which is now before the Legislature awaiting its action.

As the law was afterwards amended and altered, it is here given as passed and approved by the Governor, June 12, 1878:

AN ACT

For the taxation of dogs and the protection of sheep.

SECTION 1. *Be it enacted, &c.*, That from and after the passage of this act, there shall be assessed, levied and collected, annually, with other county taxes, in each of the townships and boroughs of this commonwealth, from the owners and keepers of dogs, the following named taxes, namely: For each male dog, the sum of fifty cents, and for every female dog, the sum of one dollar, to be paid to the treasurer of the county where collected, to be kept by him separate and in such manner that he can know how much has been collected from each township and borough, and how much paid out for losses or damages in each, at any time, to be a fund from which persons sustaining loss or damage to sheep by a dog or dogs, and the necessary costs in establishing their claim therefor, as herein provided, may be paid.

SECTION 2. For the purpose of levying and collecting such taxes, the assessors in each township and borough shall, annually, at the time of assessing other taxable property, ascertain and return to the county commissioners of their county a true statement of all the dogs in their townships and boroughs, respectively, and the names of the persons owning or keeping such dogs, and how many of each sex is kept or owned by each person; and such commissioners in each county shall, annually, levy and cause to be collected the taxes hereinbefore named, with, and in the same manner, and for the same compensation, that other county taxes are collected.

SECTION 3. That whenever any person shall sustain any loss or damage to sheep by a dog or dogs, in any township or borough, such person, or his or her agent or attorney, may complain to any justice of the peace of such township or borough, in writing, to be signed by the person making such complaint, stating therein when, where, and how such damage was done, and by whose dog or dogs, if known; whereupon the justice of the peace to whom such complaint shall be made, shall cause a notice to be served on the owner or keeper of the dog or dogs causing the damage, if known, that a complaint has been made to him of such loss or damage; and if the owner or keeper of such dog or dogs does not appear, as soon as practicable, and settle and pay for such loss or damage, then such justice shall appoint three competent disinterested persons, not related to the claimant or other person interested therein, to appraise the loss or damage sustained by the claimant; and such appraisers, after being sworn or affirmed by such justice of the peace, or some other competent person, to perform the duties of their appointment without partiality and according to the best of their judgment and ability, shall, as soon as practicable, examine the place where the damage is claimed to have been done, and the sheep injured or killed, if practicable, and they are requested to do so, and shall be examined, on oath or affirmation to be administered by one of them, any witness called before them by a subpœna from such justice or otherwise, and after making diligent inquiry in relation to such claim, shall determine and report to such justice in writing whether any such damage has been sustained, and the amount thereof, and who was the owner or keeper of the dog or dogs, if known, by which such damage has been done, and whether or not any part thereof was caused by a dog owned or kept by the claimant, which report, so made, shall be signed by a majority of such appraisers, and delivered to the justice by whom they were appointed.

SECTION 4. That upon receiving such report, the said justice shall immediately make a certificate thereon or thereto, signed and sealed by him, that such appraisers were duly appointed and sworn by him, and that they made such report; and if by such report it appears that any damages have been sustained by the complainant, the said justice shall deliver such report and all papers relating to the case, to such claimant or his or her agent or attorney, upon payment of the costs up to that time, hereinafter provided, (or having the same secured to be paid,) to be delivered to the commissioners of the county where such damages have been sustained to be filed in their office.

SECTION 5. That upon the commissioners of the county receiving such report, it shall appear thereby that a certain amount of damage or loss has been sustained by the claimant to sheep, by a dog or dogs not owned or kept by him or her, they shall immediately draw their order on the treasurer of such county in favor of the claimant for the amount of loss or damage such claimant has sustained according to such report, with necessary and proper costs incurred as aforesaid, to be paid out of the fund raised or to be raised by taxes on dogs as hereinbefore provided; and if it shall appear by such report or otherwise, that a responsible person was the owner or keeper of the dog or dogs by which the damage complained of was done, and there is a reasonable probability such damages and costs can be collected from such owner or keeper, then such commissioners shall immediately proceed, in the manner provided by law for the collection of debts and costs of like amount, to collect such damages and costs by a suit or suits from the owner or owners or keeper or keepers of such dog or dogs, and place the proceeds thereof, less costs, in the proper sheep fund of the county: *Provided*, At any and all times, it shall be the duty of the owner of any sheep-killing dog or dogs, or any person owning sheep, to kill any and all dogs guilty of killing sheep within this Commonwealth.

SECTION 6. That all dogs in this Commonwealth shall hereafter be personal property and subjects of larceny, and the owner or keeper of any dog shall be liable to the county commissioners for all loss or damage to sheep by such dog, with all the necessary costs incurred in recovering and collecting such damages, including an attorney fee of five dollars, if finally determined before a justice of the peace, and of ten dollars if tried in a court of common pleas; but at any time after notice of a claim for damages under the provisions of this act, the owner or keeper of any dog may tender to the claimant or his agent or attorney making such claim a sum of money equal to the loss or damage sustained, or may offer before a justice of the peace, with notice to the claimant, his agent or attorney, as aforesaid, a judgment in an action of trespass for the amount of such loss or damage, and all costs up to the time of such offer, which offer, for a fee of twenty cents, shall be entered on the docket of such justice; and in case the claimant in such case, or commissioners, as the case may be, shall not accept of such tender or offer of judgment, and afterwards on the final determination of such case shall not recover a greater amount than the sum so tendered or for which a judgment has been offered, as aforesaid, besides the interest and cost since such tender or offer, as the case may be, such claimant or commissioners shall not recover any costs accruing after such tender or offer, but shall pay to the defendant or defendants the costs such defendant or defendants have incurred since such offer or tender, including an attorney fee as hereinbefore provided in case of a recovery by claimants, which costs may be deducted from the amount of any judgment recovered in such case by the claimants or commissioners, and if such judgment is not sufficient such costs may be collected by an action of debt in any court having jurisdiction of such amount as in other cases of debt.

SECTION 7. That justices of the peace for the special services under the provisions of this act, shall be entitled to one dollar for each case, and the appraisers each one dollar per day for the time necessarily spent by them in investigating each claim, to be paid by the claimant in such case.

SECTION 8. That at the end of each year, the commissioners of each county shall certify to the treasurer of the county, the several claims and amounts thereof, filed in their office under the provisions of this act, remaining unpaid; and if any such treasurer shall have in his hands, of moneys collected for the payment thereof, more than two hundred dollars above the amount of such claims, he shall immediately apportion and distribute the excess to the several school districts in such county, in proportion to the amount of such balance or excess raised by said taxes on dogs in each or in the several townships or borough forming such districts, respectively, and shall notify the school treasurer of such districts how much it is entitled to of such moneys, and shall pay the same to such school treasurers, on their receipts and orders for the same, for the support of the common schools of such district.

SECTION 9. That this act shall not repeal or affect the provisions of any special law in relation to the same subject in any county of this commonwealth.

SECTION 10. That the sheriff of each county, on the request of the county commissioners, shall cause this act to be published therein, with and in the same manner as notices of the next general election shall be published; and for the purpose of deciding whether or not the provisions of this act are desired in the several counties, the qualified electors therein may vote at such election, by ballots written or printed on the outside "Sheep Law," and on the inside "For the Sheep Law," or "Against the Sheep Law; and in each county wherein it shall appear by a proper count of such ballots that a majority are "For the Sheep Law," this act shall immediately take effect, but in no other county until a majority of the qualified electors thereof, after like advertisements in like manner, have determined that they desire this act to take effect therein: *Provided*, That there shall be no advertisement or election for such purpose in any county oftner than once in two years.

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The next essay having been called for, was as follows:

THE BEST VARIETIES OF FRUIT FOR PENNSYLVANIA.

By H. M. ENGLE, *Member from Lancaster.*

The apple crop being of more value in our State than all other fruit crops combined, makes it of vast importance. It is impossible to do the subject justice in one short essay. The great variation of soil makes it not an easy task, when in addition we add the difference of both altitude and latitude, which makes the variation of climate probably as much as that of soil. Meteorological differences have also great bearing upon fruit crops. The difficulty is not from want of varieties (for we have enough to confuse almost any one,) but from want of a proper system for testing them in the different localities. Proper organizations have always been and are still wanting throughout the State to diffuse the knowledge necessary to enable any one to make out a list of varieties, such as would give the required information. There are but few active horticultural organizations in our State. The PennsylvaniaHorticultural Society is perhaps the oldest in the country, but its influence has never extended far beyond Philadelphia.

The Pennsylvania Fruit Growers' Society, in less than twenty years, has accomplished much, and its influence extends over a much larger area, but thus far not half the counties in the State are represented. May we hope that the best talent not only in the agricultural, but also in horticultural interests in every county in the State will soon be represented in this Board. Should such a result be realized, the combined knowledge of its members would contain a store of matter from which a report on the fruits of our State could be more intelligently made than is possible with all the present available sources. The Pennsylvania Fruit Growers' Society has in progress a catalogue of fruits adapted to our State, which will be the most reliable for Pennsylvania yet published; but it cannot be made complete until the State is fully represented in that society. The great number of valuable varieties of apples in this State makes this a difficult task, and especially so because many varieties are popular only in a few districts, while there are few kinds that are successfully grown everywhere. Therefore the only accurate report that can be made will be from statistics showing what varieties are best adapted to different sections of the State, and which information can only be obtained by proper testing. The majority of farmers are not disposed to incur such inconvenience, therefore it is only the more progressive that we can rely upon to accomplish much in this direction. One grand mistake that Pennsylvanians have made, was the planting of so many northern winter apples, which have proven to be only fall apples, especially in the eastern section of our State; at the same time some of the kinds most popular in the eastern counties are rejected by some fruit growers in the mountain districts. All this proves that a more thorough knowledge in the matter of selection is of the utmost importance. Much has been achieved toward acquiring this much desired knowledge by the progressive pomologists of our State. It is therefore with gratification that we look upon what has been accomplished, while we look forward with hope toward still greater achievements in pomological knowledge.

A more extensive knowledge of geology, as also meteorology, would be of vast importance to the intelligent horticulturist. The geological survey of our State, when complete, can not help but become very useful, not only to agriculture, but to horticulture as well. Were we in possession of facts pertaining to soil, temperature, and varieties best adapted to different localities, our success then would not be complete without a knowledge of how to manage our trees from the time of planting to the marketing of their crops, which embraces planting, pruning, thinning of fruit, proper fertilizers during the different stages of growth, keeping down destructive insects, applying fruits to their best uses so as to realize the greatest returns, with other knowledge necessary to make fruit growing what it should be. It is, also, of great importance, from a commercial standpoint, that our State should realize a profit from this branch of industry, as well as from any other. Instead of paying to other States annually hundreds of thousands of dollars for apples and other fruit, which could as well be grown within her own borders. In a correspondence with a friend in Bucks county, he stated that from fifteen to eighteen thousand bushels of apples, crop of 1877, were shipped from a single railroad station. From another source, I learn that $1,200 was realized from one orchard, and that the dealer who purchased them doubled his money on them; also, that other orchards in that section did nearly as well. All these favorable reports are from the same county. Now it is not to be presumed that Bucks county is better adapted to apple growing than most other counties of our State; but that the orchardists have adapted themselves to the business of apple growing. Equally favorable reports could, no doubt, be collected from other sections of our State, even in the off year.

I can hardly forgo, at this juncture, to refer to the hundreds of thousands of bushels of peaches that are annually purchased from the little State of Delaware, while our State has thousands of acres just as well adapted to the growing of this crop as the former. Only a few years ago peaches were shipped from Cumberland valley to Baltimore, while the crop was short in Delaware and Eastern Maryland. The sections best adapted to this crop lie principally south of the Susquehanna river; but especially in the southern tier counties. There is no doubt in the mind of your essayist, that should capitalists understanding the business embark in this enterprise in the sections referred to, the trade of Delaware peaches in the middle and western sections of this State would, in a few years, be vastly curtailed, if not entirely cut off. A suggestion just here may not be out of place—that the Secretary of this Board, while collecting statistics relative to the comparative value of crops, at the same time solicit reports, so far as possible, of the actual value of the fruit crops of our State, which would demonstrate their importance, and the necessity of their fostering care by the State, so as to make them not only of much greater commercial value; but also to enable our State to throw off its dependence upon other States for so large a proportion of our fruit supplies.

Among the apples that have proven valuable in our State are the following:

Summer—Early Harvest, Early Strawberry, Primate, Summer Queen, All Summer, Red Astrachan, Dutchess of Oldenburg, Sweet Bough, Summer Sweet Paradise.

Autumn—Porter, Maiden's Blush, Summer Rambo, Fall Pippin, Jeffries, Garvenstein.

Early winter—Smokehouse, Rambo, Falawater, Pittsburgh Pippin.

Winter—Smith's Cider, York Imperial, Newtown Pippin, York Stripe, Peck's Pleasant, Ewalt, Rome Beauty, Domine, Romanite, Yellow Bellflower, Winter Sweet Paradise, Talman's Sweet, Lady's Sweet.

Northern winter apples that have proven of value, but in eastern Pennsylvania are simply fall and early winter apples, are the following: Baldwin, Rhode Island Greening, Hubbardston, Northern Spy, Esopus Spitzenberg, Roxbury Russet, Twenty Ounce, King, besides other standard varieties in more northern latitudes. These popular northern apples, have, however, proven equally valuable in the north-western counties of our State as good keepers. In the mountain districts they are also good winter apples, while some of the most popular kinds in eastern Pennsylvania are being rejected in the higher altitudes. They are many other valuable varieties that might be recommended, but it is a general mistake to plant too many kinds in one orchard, unless for the purpose of testing.

The many excellent new varieties of grapes foreshadow a fresh impetus toward the extension of this desirable fruit. No kind of fruit will produce a large yield, with such certainty, as the vines can be laid down during the winter and be protected against any degree of cold. The pruning and training has been so much mystified as to deter many from attempting its culture, which, however, is just as simple as that of any other fruit. The Concord still continues to be the grape for the million, while Ives, Martha, Iona, Delaware, Telegraph, with some of the newer varieties, are successfully grown in the different sections of the State.

Small fruits should not be neglected by any family that has a square rod of ground to plant, but especially the strawberry, as it is so delicious as to gratify the taste of the most fastidious, while it is so productive and certain of a crop in almost any season, that it seems almost criminal to reject it on the part of heads of many families, whose juniors almost famish for the want of such palatable and health-producing food in its season. Wilson's Albany is still extensively grown, but is fast giving away to Charles Downing and other varieties of better quality.

On motion the discussion of this essay was postponed until after the reading of the two next essays on the list, viz:

FRUIT—HOW BEST SECURED AND PRESERVED.

By Prof. D. WILSON, *Member from Juniata.*

The importance and value of the fruit crop, estimated at $140,000,000, is equal to nearly one half of the wheat crop. As an article of food for man and beast, it is pleasant to the taste, and both nourishing and healthful to the body. Being not merely a luxury, but an actual necessity to the human race. By a beneficent arrangement of Divine Providence, it is made to grow in almost every latitude and in great variety of form and taste; and while some kinds last for a considerable time, many are transient, and soon pass into decay. It becomes then an interesting question how we may best secure it for our use. How we may preserve it in its natural state for a much longer period of time than that which nature has assigned to it? We shall say nothing about the various methods of preserving the small fruits, and large ones, too, by the long used process of preserving them by steeping them in boiling syrup made of sugar. However delicious to the taste fruits thus treated may be, it is manifested that this method is too expensive ever to come into general use, except as an occasional luxury to be indulged in only by the well to do. Nor need we say much about the ordinary process of *canning* fruits. It is true that this has now become one of the valuable industries of the country. Fruits of all kinds and of all seasons and climates, all the vegetables used as human food, and even fresh meats are successfully canned. In the fruit season thousands of people are engaged, and hundreds of thousands of capital are invested in this business. Increasing every year as it is in magnitude and importance, and yet neither by sugar preserving nor by canning are we able to retain in its freshness and perfection the natural flavor of the fruits. By what means, then, can we retain this flavor? Without noticing any of the abortive failures that have hitherto disappointed fruit growers in their efforts to keep fruits fresh and flavory for months after their proper season has passed, we shall attempt to indicate some of the conditions by which this may, to a considerable entent, be accomplished; and shall confine our remarks mainly to the larger fruits, and shall use the *apple* for illustration.

1. One of the first requisites in securing and preserving fruit successfully is, *care in picking.* They may not be beaten down with poles; they may not be shaken down from the limbs by strong arms; but they must be *picked*, carefully picked, *one by one*, *with the hand*, and all the better, too, if the stem remains attached to the fruit. They must receive no bruise from the limbs of the tree, nor from the ground, nor from one another. They must be laid carefully in vessels having no sharp edges, so as to avoid bruising them while conveying them to the place of storing; and, in general, from the time they are plucked from the tree until they are delivered into the hands of the consumer, they must be handled as carefully as you would handle a basket of eggs. This careful handling is altogether indispensable.

2. They must be carefully assorted and classified. Not only must the different varieties be kept each by itself, but the early should be kept separate from the late, the juicy from the dry, the hard from the soft, the well-formed from the ill-formed, &c., &c. The bruised, the knotty, the specked, the worm-eaten, should be rigidly excluded from the good, and devoted to immediate use, either for cooking, canning, or drying.

After they have been thus carefully picked and assorted, how will you keep them, fresh and flavory, from autumn to harvest? This is just the question which we all would rejoice to be able to answer correctly. In order that a sound, ripe apple or pear may be kept for a long time in its natural state, four things are absolutely necessary: 1. It must be kept in a dry atmosphere. 2. Light, as a general thing, must be excluded. 3. It must be kept at a regular temperature, and that, at about 40° Fahrenheit. And, 4, it must be so placed as to be capable of being observed.

1. As to the dryness of the atmosphere. If in addition to the natural moisture constantly exuding from the fruit, by evaporation, it is surrounded

with air laden with moisture arising from a damp cellar or cave, the tendency to decay must inevitably be hastened. This is the general experience of those attempting to keep apples in damp cellars, or caves, or buried in the earth.

2. As to light. It is not because light in itself exercises any special deleterious chemical influence on the fruit, as because, mostly, when you admit light, you admit a change of temperature. I suppose light might be admitted through glass without much injury.

3. As to the regular temperature of about 40°. If you allow the temperature to fall to 32°, or lower, your fruit will freeze; and if you permit it to rise much above 40°, the degree of heat will produce rapid rotting.

4. There must also be some convenient arrangement made to enable you to observe how your store of fruit is keeping, as from time to time you observe it.

How can the fruit man secure all these conditions in a way that is both convenient and economical? Long ago people kept even very perishable fruit by storing it away in common ice-houses. This has given way to fruit rooms, constructed much like above ground ice-houses. They may be built of any material suitable for an ice-house, with double or triple walls, doors, &c. The inside is furnished with shelves, or sometimes with drawers, and the fruit is carefully laid on these shelves, not more than three layers thick to a shelf. If there are three board walls and the interior space between the two outer walls is filled with pulverized charcoal or dry sawdust, and the house kept closed, or opened for airing only on moderate days, the fruit will not freeze even in the depth of winter, and in the summer it can be ventilated whenever there is a drying wind. The shelves or drawers should be about three feet above the floor. The most successful experiment of which I ever heard, of keeping apples for more than a year, was by an English gentleman who kept them in a very dry cellar about three feet above the ground. He had shelves, made of a convenient length and breadth, upon which he placed a layer of apples, and then covered them with dry sand, upon this first layer he placed a second and third, covering each layer with sand to absorb the moisture escaping from the apple, and to exclude the moisture, light, and heat in the atmosphere. He kept his apples sound, fresh, and well flavored until late in the following autumn. The experience of the French in managing pears, and of those who raise and ship oranges, lemons, limes, grapes, &c., demonstrates that there must be fine paper, cotton, fine charcoal, dry sand, ground plaster, (dry,) or sawdust, surrounding the fruit to absorb the moisture or it will not keep. Many have succeeded tolerably well in keeping fruit in dry cellars or in dry gravelly caves, but these cellars or caves naturally possessed in a measure, the conditions of the cool dry atmosphere.

The fruit room, on a small scale, might be possessed by every farmer having a moderate quantity of fruit to store away.

But in the vicinity of a large town, or in a populous community in which much fruit is grown, we think a large fruit-house might be maintained with all the necessary appliances of apartments, shelves, heat, ice, &c., at a moderate charge for those who might choose to store their valuable fruits in it. It would be simpler than a cheese factory or butter factory.

One very common mistake made in keeping apples, is that of keeping them in very large piles. It is obvious that this method must hasten decay.

One thing is sure, that the value of the apple crop even to the ordinary family, makes it worth the while of everybody, and particularly of this Board, to investigate this subject thoroughly, and to give the result of these investigations to the public. And it is to be hoped that *now* and *here* some additional and reliable knowledge will be obtained upon this subject by a familiar and interlocutory discussion of it.

FRUIT—WHEN, WHERE, AND HOW TO MARKET.

By D. H. FORESMAN, *Member from Lycoming.*

In the allotment of questions for consideration at this meeting, the advisory committee could scarcely have selected one upon which I feel less posted, or with which I have less practical experience. Therefore, what I have to say will partake more of the nature of theory than practice, more of how it *should be* done than of how *it is* done.

When to Market.

If you have anything like a good market, the proper time to market fruit is when it is ripe, for no crop loses more by keeping. Even the most successful grower will tell you that the losses from decay are so great that it requires a very large increase in price to warrant holding the the product. Many kinds must needs be marketed as soon as ripe. Of course, my remarks refer to apples and pears as that class which may be preserved.

If, however, the grower decides to hold his crop for higher prices, he must use judgment as to the kinds which he keeps, for some kinds will decay so rapidly as to destroy all chance of profit from a possible advance in price.

If to the market value in the fall, we add the expense of handling, storage, and interest upon their value, to the loss by decay and shrinkage, we will usually find the margin on the wrong side, and that we cannot compete with the New England fruit grower, who, either from the effect of soil, climate, or some other cause, can produce a better keeping fruit than we can. In answer, then, to the first portion of my subject, I would say, market as soon as the fruit is in proper order, and before it is so ripe as to render handling difficult.

Where to Market.

If you have a reasonably good market near at home in which you can sell without paying freight and commission, it is, in nine cases out of ten, the best one for you. Freight and commissions swallow up the margin for profit more in the fruit trade than in any other. Thousands of bushels of peaches are sent out of Delaware orchards which hardly pay freight and commissions, and often do not pay for these charges. The best market for the grower on a moderate scale is that of his nearest town, in which he can sell from his wagon without any other expense than his time. In this market he either obtains *all* the profit there is, or else avoids a large proportion of the loss. In the agricultural papers we often read of large sums having been realized by fruit culture, but such cases are always to be found in the neighborhood of towns and cities furnishing a good ready market, so that the producer saves freight, commission, and time. I do not take the ground that a distant market may not prove profitable, but I do think that the chances are against it, and in favor of lower prices nearer home and sales for cash.

How to Market.

Always market in the best possible condition, and *pick close*. It will not pay to market inferior fruit with good, with the expectation that the good will sell the poor—it will not do it, and if the two are marketed together, the whole will often not bring as much money as the good would have done if marketed alone. Many cases have been given of pears in the hands of city commission merchants having been picked over and one third left out as inferior, and still the re-assorted fruit brought higher prices than the whole would have done. If you pack for a distant market, do not place the best fruit in the ends of the barrels, under the impression that you will thereby deceive the purchaser. This has become so common that the buyer always makes sufficient allowance for it, or will refuse to to buy unless the whole contents are exposed to view. A dealer, who by fair dealing and packing, establishes his credit in the market, even if he cannot sell for a higher price, (in which he seldom fails,) can, at least, find more ready sale at all times, and especially when the market is dull. Even when selling from the wagon, in a "home market," it will pay to cull close. If you choose, you may take the best of the culls along in your wagon, and sell them at a lower price, but it will often pay as well to leave them at home, and especially so if the market is well supplied and dull. In a good brisk market you can, of course, find a market for inferior fruit, but if not culled out, it in *all cases* hurts the sale of the good in a *greater* proportion than it increases the measure. In my market (Williamsport) carefully handled, closely culled, and sound fruit will always sell easiest, and brings the best price, and in a dull market find the most ready sale, and so it is the world over.

Mr. MORRIS. I saw Mr. Eby, of Harrisburg, have some nice apples of 1876. How he kept them in that way, I do not know. A description would be of interest.

Mr. J. R. EBY, of Harrisburg. I have but a few words to say on the subject; and it is more to explain, than anything else, that it was by accident that these apples were kept. They were not wrapped; but kept in a cellar of probably forty degrees. They were laid in there, and they have kept better than those in wrappings. I was surprised to find them in the condition they were, when I came to take them out. They were taken out last October; picked a year before, and some fifteen in number. Mr. Morris, I believe, examined them, and found them to be in good condition.

Mr. MUMMA. Of what variety are they?

Mr. EBY. There is one variety I do not know. I gave one to Mr. Engle to name. One was an ordinary winter pippin.

Mr. KELLER. Where they kept in a damp or moist place?

Mr. EBY. They were kept in a very nice, dry tub.

Mr. KELLER, of Schuylkill. I used to keep my apples in a cool, dry cellar; but they would not remain satisfactory. After a time, they would shrink, and, as a natural consequence, decay. I changed then to a cellar where it was cool and damp all the time; and the same apples which would rot in the dry cellar would keep for a month to a month and a half in the damp place. I was surprised that the apples would keep plump and full, where otherwise they would decay. A great many who have written on the subject, have held the theory that the place of keeping should be dry, but my experience has been the reverse.

Prof. D. WILSON, of Juniata. I met a gentleman the other day who is very fond of sweet pumpkins, and who had been using them all his life, but could not keep them satisfactorily. First, he tried to keep them in his cellar, and they would invariably rot. Curiously, he set some of his best on a shelf where there is more heat, and they kept there from that pumpkin season until the next year. He found they kept better in that condition than in any other way. Every kind of fruit they now keep up in the same way.

Dr. JAMES CALDER, of State College. This subject seems to be confined entirely to apples. I think if we were to meet here every day; for three days, we would not exhaust the subject of preserving fruit. It is one of great profit, for the more fruit, the better it is for us all.

In regard to preserving apples, my experience is that it is extremely essential that the apples be picked when thoroughly ripe. There is a difference between pears and apples. A pear that ripens on the tree tastes—many varieties—almost as dry as a mullein stalk. The pear, when on the tree, lift with the hand gently, and if it still adheres to the stem, it is not fit to be gathered. If it appears fit, it should be taken and ripened in the house. Keep them comparatively cool, and when you wish them for domestic use, or for market, bring them into a warm room.

Apples, I think, should be allowed to ripen on the tree, and picked with care, as Prof. Wilson has referred to.

I took dinner with a gentleman in Centre county, and was informed by him of an accidental discovery made by which he was able to keep fruit for twelve months. The boy who was employed to pick apples, hid some away. Being surprised, he hastily put them into a bag of plaster, and afterwards forgot them. When the gentleman went to get the plaster out of the bags the next spring, the apples were found perfectly sound. He took a hint from that, and prepared a small box. Having carefully selected his fruit, he took plaster, and then apples and plaster again, until he filled the box, which he then covered. He put the box into a warm room in his house, or a room where he supposed the contents would not be frozen at all; and there he left it until apples came again. He found by the experiment that he could keep apples a whole year. On his telling me the discovery, I reminded him of the saying of the proof of the pudding, &c. On the 4th day of July, I found a mysterious looking box at my place. Students some times send them, and I was very shy. I concluded I hadn't any one there who would do anything very serious, and I ventured to open. Then I found it was a box of beautiful apples. I tasted them, and found them admirable. I endeavor to have fruit on my table, but never expected that on the 1st of July, I should have fine apples. I had them exposed to the heat of my room for nearly a month, and yet they were in fine condition. The gentleman gave me his plan, with plaster, and I have found the apples to be good.

On a former occasion it was stated, in the Fruit Growers' Society, that if one would put in salt it would preserve the fruit. Some were curious enough to ask what was the result upon the flavor of the apples. The initiator replied that the apples kept very well, but as to the taste it was very much like a taste of Lot's wife.

Mr. KELLER, of Schuylkill county. What shall we do with the apple tree borer, an insect that has become very destructive, and, in fact, is destroying most of our orchards? It is a beautiful beetle, when it comes to perfection; so much so, that, when you see it, it seems a pity to destroy it. I find that where there is no protection to the trees. They are destroyed in a very short time. I would like to have the experience of gentlemen on the subject.

H. M. ENGLE, of Lancaster. The habits of the apple tree borer, and how to destroy it, are discussed in the reports of the Pennsylvania Fruit Growers' Society, by Mr. Rathvon and several other gentlemen.

Dr. JAMES CALDER, of State College. The only way I find to get rid of them is to have an investigating committee several times a year, with the pruning knife, rod, and guage; and whenever you discover any dust made by the worm—of course, he is there—get down on your knees, and go for him. Do that about twice a year, and thoroughly, and you will not have the trouble you now complain of.

Mr. BEEBE. At what season?

Dr. CALDER. In the spring, and then toward fall.

Mr. KELLER. That would do very well, when they go in straight.

Dr. CALDER. Begin at the beginning, and follow up.

Mr. KELLER. Sometimes they make an elbow, and you cannot follow them. And then, if you take a knife, you may destroy the tree with it.

Dr. CALDER. Begin before the tree is half dead.

Mr. KELLER. I find the best plan is to prevent it. The insect is biennial; it comes to perfection every two years, and they leave the tree about the latter part of May, or the beginning of June; then they copulate, and in the course of a month they do the injury. No human eye can see them. They go away down into the bottom of the rubbish, and deposit in that; and in a very few days they work into the soft part, (because, where the ground touches the bark, it is soft,) and work up, and get so deep into the wood sometimes that they bore through. One year I got new trees, as my old orchard had been destroyed. I had had experience in planting trees before, and planted some in my yard, so as to have them for shade as well as for fruit. One morning I found one of the trees lying flat over. It was about an inch to an inch and a half through. I found it had been entirely cut off in the grass. I had had no suspicion before that it was not all right. A little storm had been blowing and knocked it over. I found, in taking it up, two of these worms, having no wings, but just beginning to take their feet. If they had wings, they were still unable to use them. I have been experimenting to keep them until they become perfect.

I then planted this young orchard, and in doing so I got stout wrapping paper at one of hardware stores, and made an excavation in the ground around the trees several inches deep, and let the paper come up twelve or eighteen inches, and then tied it with yarn used for tying up goods—tying it close to the tree. I then put coal tar on this paper, to make it imprevious to water. I took the ground that when the beetle came around to deposit, that it must either do so on the paper or higher up, where a person could find it. I adopted this course for several years, but finally they got in and destroyed several trees. One may be ever so careful. They will deposit their eggs, though you make the protection of tin. I can say that. When I planted the orchard I speak of, I thought I had got ahead of these fellows; but it seems I had not. I tied the trees to stakes. When they found they could not get into the trees, they went into the straw. To destroy them afterwards we did almost as much injury as the borers did themselves.

The President then announced as the next essay in order:

BARN-YARD MANURE—THE BEST AND MOST ECONOMICAL MODE OF MANUFACTURE.

By Colonel James Young, *Member from Dauphin.*

What was once considered in this country a disagreeable appendage to to all barns, and a necessary nuisance, has of late years resolved itself into one of the greatest blessings of the farm. What would a farm in the Middle States be now without its barn-yard manure? What would the Pennsylvania farmer now put upon his land in return for the annual drain upon it, if he were deprived of the offal of his cattle? Not only has the barn-yard manure grown in importance, but there is an increasing sentiment that unless there are larger deposits than the barn-yard can afford to each farm, the land will soon be worn out, and the once fertile soil become utterly unfit for use. Since barn-yard manure has taken such a high position among the thinking class of farmers, it becomes necessary to give the matter serious attention, and to note with care how best to prepare sufficient for one's own use, and the most economical method of manufacture. The time and mode of application, and the effect of different kinds upon various crops, are also matters of great and growing importance. But this essay proposes to treat mainly upon the best and most economical methods of manufacture, embracing not theory simply, for years of practice and watching the results of application are both embodied in everything herewith presented.

The richest barn-yard manure produced is from corn-fed cattle; the next is, perhaps, from the droppings of grain-fed horses. The two mixed together make a very acceptable fertillizer, and a liberal application thereof to any soil will make the whole face of nature smile with an abundant harvest. In this connection there is another element richer and more acceptable to the land, that is almost wholly lost from every barn-yard. This element is the liquid matter so soggy, sputtery, and unpleasant for farmers with leaky boots in moist weather. Where a farmer can so arrange his barn-yard that this liquid will run into a pit, and be preserved for sprinkling his soil, he will find, by a few applications, that the richest of all his accessories has for years been running to waste. It is surprising how much of this liquid will accumulate in a year on an ordinary farm; and it is more surprising to the experimenter when he notes the beneficial results of the application of this liquid upon his fields.

In preparing a sufficient quantity of manure, experience has demonstrated that it pays to buy up a quantity of cattle every year—enough to consume all the corn raised on the place, and some times many bushels more. It is far more economical to have cattle enough to eat up all the corn raised, and turn that into manure at home, and the fat cattle into money, than to sell the corn in market, and with the proceeds buy artificial manure. Our farmers are selling to much feed and manufacturing to little manure. Consequently their land is becoming poorer, instead of richer, and with the present course persisted in, Pennsylvania will not be long in having a larger percentage of worn-out lands than some of the New England States now have. The more a Pennsylvania farmer judiciously puts upon his land, the more will he be able to take off. The great mistake now being made is putting so little on and taking off so much.

One of the best ways of securing an abundance of manure is to go along creeks, and where there are eddies gather up the deposits. If the farmer is living along a river or canal, hundreds of thousands of loads can be gathered at the eddies in low stages of water; and these deposits, gathered with judgment, will be found to make the richest of fertilizers. Large quantities of exceedingly rich manure gather in mill dams, the accumulation, oftimes, of miles, of territory. Millions of dollars' worth of such rich manure now lie undisturbed throughout the State, which, if placed on corn or grass, would invaribly manifest its value in improved crops the very next harvest. There are seasons when a farmer's time cannot possibly be more profitably employed than in gathering up the rich beds of so-called "muck" in the eddies of small and large streams, in the beds of canals, and in the bottoms of mill-dams, or in other places where rich soil has been washed in. In fact, with some this work will be found more profitable ultimately than gathering in the crops of a doubtful harvest. Much of this manure can be gathered at different times, and piled up for use until the land is better fitted to receive it. Having personally to use large quantities of fertilizers, it became an imperative necessity for me to look around and learn where I could get it the best and the cheapest, and now I use hundreds and thousands of loads, gathered in the manner described. I was first led to this course by noting the gratifying effects of the deposits of a large reclaimed swamp spread over my fields. These deposits proved to be from two to seven feet deep over the entire reclaimed space. It was first used in the garden, upon the suggestion of the German gardener, and found so valuable that ere long it was being scattered over the fields. Manure of this description lasts longer, and one gets more wear out of it than even barn-yard manure.

Some farmers appear to place considerable stress upon manure made of forest leaves in compost heaps; but they will find a great saving and better manure by hauling from eddies of creeks and other streams, and from the deposits of mill-dams.

Another very good and really economical method of manufacturing barn-yard manure is, if you live near a town, to give your surplus straw to owners of horses and stock, asking in return only the manure from their stables or barn-yards. This applies only to those who feed grain. Where they keep their horses or cattle on straw for provender, it is best to send the straw elsewhere. But to those who feed their animals well it pays to furnish them with straw for bedding gratuitously, with the privilege of hauling away their manure. Then the farmer is more likely to be called upon to furnish these parties with hay at remunerative prices. In hauling away manure it is best to select and load by itself that which will do for immediate distribution over a field, and dispose of it accordingly; that which is not fit for this purpose can be taken to the pile held in waiting for decomposition. It is no profitable business to handle manure too often, and if once loading will accomplish the purpose, there is not much wisdom in loading twice. With the manure from town, a pile of coal or wood ashes may be thrown on a load with good results.

To prepare manure properly requires careful study of soils and fertilizers, close observation of the effects upon crops, and a tact sufficient to make the best uses of the best methods. When I was in the lumber business, I conceived the idea that it did not require much intelligence to be a farmer. I find that it not only requires intelligence, but, after years of experience, more intelligence than I possess. There is not enough education in the farming of this country. It is the most important of all secular occupations, and requires wisdom, judgment, and understanding all the time, and in every season. A practical farmer, to successfully carry on his work, cannot be too well educated.

Fertilizers artificially manufactured throughout are not the most economical in my experience. The good old barn-yard manure first, then the deposits of the streams, and then the next best you can get is the policy of my experience. With economy and method, and a steady, persistent attachment to the calling of agriculture, then the manure, such as I have described, may well be accepted as the staff of life of the thrifty, profitable farm.

Mr. BEEBE, of Venango county. I would like to know whether Colonel Young has ever experimented by hauling muck in heaps, and utilizing it afterwards; hauling it, and piling it in heaps, and afterwards hauling it upon the field?

Colonel YOUNG. In this section we wait until it can be hauled on the fields, and then we haul it on immediately. It does not suit to haul it from the beds of canals during the summer, as then the teams are otherwise very busily employed, and the canals are full of water. I find it pulverizes much better to allow it to stand; but I haul it whenever I can, and spread it soon after.

The PRESIDENT, (Governor Hartranft.) Do you put lime with it?

Colonel YOUNG. I have no doubt that lime would add to the quality. I have been so situated that I could obtain large quantities of these deposits, and haul from twelve hundred to fifteen hundred loads every winter, and did not mix it with lime.

The SECRETARY. If Professor Lesley is right, Colonel Young is putting on lime.

Colonel YOUNG. Yes, sir.

Mr. BEEBE. You consider it important to have lime. In taking it from the stream, it is better to have the winter frosts and the winter elements act upon it.

Colonel YOUNG. I think there is no doubt it is all the better if permitted to lie a year; at least, say from now till spring.

Mr. BEEBE. It has been held that it is of no value without, but I noticed it was differently practiced in the Genessee valley last fall. I observed there very many farmers, who have swamps, drawing the muck right out, and spreading it directly upon their fields, with apparently good results. At least, they expected to reap a rich return the first harvest.

Mr. ENGLE, of Lancaster. This question of manure is valuable, and the address of Colonel Young simply illustrates the importance of geology in connection with manure. The collection and making use of deposits in small streams strengthens the doctrine advanced by Professor Lesley; for these deposits are no more than the delta soil on a small scale. Almost every farmer has these deposits somewhere within reach; if not in streams in some swamp or boggy place; and it is now for him to take advantage of what he has, that his land may be made more profitable.

Prof. D. WILSON, of Juniata. Has any gentleman observed that these deposits fill the land with weeds, after they are spread over the soil?

Colonel YOUNG. The muck that I get out of reclaimed land does not; but that from the canal has a tendency that way. I have less trouble with the weeds by plowing the deposits down. But I believe if you can raise weeds, you can raise crops. Where there are good weeds I can get good crops.

Prof. WILSON. It is a pretty common opinion that muck, and especially in the deposits from streams, that the valuable manure is washed out of it. Has this been the gentleman's experience?

Colonel YOUNG. I have tried this plan now for seven or eight years, and it gives satisfaction. I even go along the roads, where I can find anything. If I get a load of anything nice, as I conceive, that goes on the fields. I save it as carefully as a load of barn-yard manure.

Mr. **WISE**, of Greene. The gentleman suggested sending straw to town, to get it manufactured into manure. I think if I did so, I should be a sufferer by it.

Colonel **YOUNG**. I have never been troubled with loss. The only trouble I have had was to know that they went by directions, not to feed the straw.

Mr. **WISE**. You must necessarily come short, I would think.

Colonel **YOUNG**. After I furnish the straw, I go from place to place and take the manure away. If I get a load of manure, and it is not fit to be distributed immediately, it is placed in the barn-yard. If it is fit, it goes upon one of the fields. I never get bad weeds. If I find any of my parties allowing weeds, or anything of the kind, to be mixed in, I cease to furnish straw.

D. H. **FORESMAN**, of Lycoming. I think you would be apt to gather up a good many Canada thistles.

Colonel **YOUNG**. I do not have them in my neighborhood.

Professor J. **HAMILTON**, of State College. I think it would be dangerous in some localities to take manure from town and distribute it upon the land; but to put it on a heap, until thoroughly rotted, would be a good remedy.

D. H. **FORESMAN**, of Lycoming. I consider this one of the most important subjects that has been before this Board, and particularly for the West Branch valley. They are more interested in keeping their farms in a high state of cultivation, than they are in fruit growing or breeding stock. Therefore, the ideas thrown out by Colonel Young's address, (which are so new to me, and so different from my plans and mode of farming,) I would like to have thoroughly understood. I cannot make manure at all of the sweepings, either of the streets or of the ditches, without first making a compost. Without hauling it on piles, and leaving it lay there, and mixing it with lime and other things, I find it is a damage. I live in the upper end of the city of Williamsport, where we have a mile of Nicholson pavement, and we have the liberty of hauling away any part of the offal. We have hundreds of loads taken away every year. Living there myself, and having the chairmanship of the highway committee of that place, I have the privilege of using the best of this. I hauled some, and it seemed to damage every crop I put it on. I then told my farmer to haul it to the farms on the river bottom. We then took this material, made it into piles, and put with it slacked lime. We then put it on the ground, and afterwards could see the effects; but putting it on in the manner Colonel Young states, it was a damage in every instance to my crops.

As to hauling straw, I never allow one single straw to go off my farm, or hay, or anything of the kind. Everything must be consumed on the farm. Everything must go through the stables. It has been my experience for nearly twenty years, living near the city, to have frequent requests for straw, and I am bothered every day almost for that very purpose. It is not very desirable for us living near cities not to keep straw for sale; but we cannot afford to let it go off our farms. I keep everything on I can; and we feed everything possible—all the hay, corn, fodder, and everything of the kind we have. We generally utilize everything in this way, and with the assistance of lime, we keep our farms up to the condition they are now in.

Mr. KURTZ, of Lancaster. I do not think there is a flaw in the essay, so far as the production of manure is concerned, except that he might have used a little lime. I think if he will try lime, he will find out its advantages. I have been through the same process as Colonel Young. I used all the offal from the tannery, the rubbish and scrapings from the streets; and I took it out to the farm, and put it on the land, and if I should tell you the results, you would not believe it, I know. I have put on one field I do not know how many loads of ashes from the yard, and tan bark, and rubbish from the streets of the town, no matter where it came from. On this nine or ten acres I raised, in two successive years, in wheat and in tobacco, $4,700 worth. I bought the land for $3,000. I sold the tobacco of four and one half acres for $1,700. The balance in wheat brought one hundred and seventy-two bushels, which I disposed of at $1 55 per bushel. The year before I sold the tobacco and wheat at such prices that the two years' proceeds amounted to $4,700. Once when I took a farm, I kept over two hundred head of cattle. Having other duties to attend to besides farming, I lost on the cattle directly, but I found I had a large quantity of manure. I took it, and put it on the land, and there were two hundred and fifty loads. But I did better than Mr. Young; I added lime as a top dressing, and it paid me better in the end. I learned the value of the street manure from a German in my lumber-yard. He and his wife were workers. She would go and gather all the waste manure she could on the streets, and they would apply it in the garden. Pretty soon they owned another house. Colonel Young has added another farm.

As to the use of the deposits of dams, when I was a boy, I hauled out of the dam two hundred loads. We had the farm rented. The dam did not belong to the man who owned the farm, but to a neighboring farmer. He said we might have the deposit. It was about three and a half feet deep. I heard my father say the benefits lasted for ten years in that very field. These deposits are no doubt of great value as a manure, and with a little lime added, the value is much increased.

THOMAS J. EDGE, (Secretary.) Referring to Mr. Foresman's remarks, is it not possible that the wood from the pavement on which the manure was gathered, prevented a beneficial effect? Wood ground up does not make a very good manure. Colonel Young uses an entirely different article; much of what he uses both he and Mr. Beebe called "muck."

Colonel YOUNG, of Dauphin. I reclaimed thirty acres of land, which had a deposit from two to seven feet thick, and from that locality I hauled thousands of loads. The place was quite swampy, but by underdraining and otherwise, I dried the ground, so that now it is one of the most productive places on the whole tract.

The SECRETARY. Was it fibrous matter, or was it more like the earth around?

Colonel YOUNG. Neither. In the spring of the year it would all fill up, and be covered with water, and each year this would leave a deposit. Perhaps this had been going on from the formation of the world.

The PRESIDENT, (Governor Hartranft.) Seventeen thousand years?

Colonel YOUNG. Yes, sir; all of that. [Laughter.]

Mr. H. M. ENGLE, of Lancaster. The remark of Mr. Foresman would seem to be incomplete, in that what he gathered was not simply the droppings on the road, but woody matter from that Nicholson pavement. Near towns it is customary for some farmers to furnish straw to stables for the manure. Where they can get it, saw-dust is sometimes purchased for manure, but we find it is worthless, without lime to decompose it, which I suppose it will do. But it creates fungus, so we have abandoned it, and would not take it, and bestow it upon our land for any crop.

Colonel **Young**. I have had some experience with saw-dust and shavings, but they would not bring the answer at all.

Mr. **Kurtz**. There is a great difference. There is the tannic acid in the tan that would destroy a Canada thistle. It depends much on the article used.

Mr. **Keller**, of Schuylkill county. As the manure question takes a very wide range, perhaps it is the most profitable subject we can discuss this session. Of the tannic acid, the gentleman is correct, but in the use of tan, that can be got over. In Schuylkill county, by combining straw and tan, they make very good manure. Piling it in large heaps we find it destroys the seeds. Where an article of itself is too strong, it is very much improved by alternating it with layers of earth.

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The essays embraced in the programme prepared by the committee having all been read and discussed, the Board proceeded to the consideration of resolutions and other business.

By request, W. G. Moore was released from service on the Executive Committee, and W. S. Roland, substituted.

M. C. **Beebe** offered the following, which was referred to a special committee, consisting of Messrs. Beebe and Hamilton:

Resolved, That the Committee on Legislation be instructed to take measures to procure the repeal of the acts of 1700 and 1784, in relation to fences in this Commonwealth.

John P. **Edge** offered the following, which, after considerations by sections, was adopted:

Whereas, The annual reports of the State Agricultural Society, and other scources of information, show that few, if any, of the county agricultural societies encourage or require the production and preparation of essays or other papers on subjects pertaining to agriculture by their members, and thereby eliciting discussion and emulation among them:

And whereas, It is important that every agency should be used to raise the standard of intelligence among the tillers of the soil; therefore,

Be it resolved, That this Board recommend that all county and local societies adopt a system of premiums and diplomas for the best papers on subjects which may be assigned for competition, to classes of three or more persons who may be volunteers or designated by the presiding officer.

Resolved, also, That it is recommended to all local societies holding fairs or exhibitions, to offer premiums or diplomas to the chairman of the committee of exhibits who shall furnish the best and most elaborate report, describing the objects in competition, the causes of success and failure, &c.

Resolved, further, That we recommend that each county or district society shall establish a scholarship in the Pennsylvania State College, and shall select from the sons or daughters of its members, by a competitive examination, the persons who shall enjoy its benefits, said persons to have been previously instructed in the public or normal schools of the State.

On motion of M. C. **Beebe**, all unfinished business was referred to the Executive Committee.

Adjourned to meet at the call of the Executive Committee.

MAY MEETING.

At a meeting of the Pennsylvania Board of Agriculture, held at Doylestown, May 30, 1878, Board called to order at two, P. M., by Vice President **BEEBE** in the chair.

Present—Messrs. Schell, Edge, (J. P.,) Young, Hood, Robinson, Beebe, Moore, Hamilton, Fahnestock, Roland, Sterling, Smith, Reeder, Banks, Foresman, Yeakle, Keller, Eves, Musselman, McFarland, and Secretary.

C. C. Musselman, of Somerset, and Chandlee Eves, of Columbia, presented credentials of election from their respective societies, which, on motion, were referred to a committee, consisting of Messrs. J. P. Edge, Hamilton, and Banks, with instructions to report at next session of the Board as to the rights of these gentlemen to membership in the Board, and also to define the term of their membership. They were also directed to inquire into the right of the Rich Hill Fair Association to a membership in the Board.

Mr. Henry T. Darlington, on behalf of the citizens of Doylestown and its vicinity, then addressed the Board, as follows:

MR. PRESIDENT AND MEMBERS OF THE BOARD: It is a pleasant duty to welcome to our town and county the official representatives of the agriculture of Pennsylvania. Chosen by the intelligent practical farmers of each county to stand for them as members of this central body, we have a right to regard you as the salt of your occupation, and to feel honored by your presence here. We shall try, on our part, to make your visit a pleasant and profitable one, and to illustrate as best we can how a prosperous and contented community can be built up almost entirely upon the results of agricultural labor.

You have met to-day, for the first time outside of the State capital, in one of the three original counties of the Commonwealth, organized bb William Penn very nearly two centuries ago. Our territory was largely settled by the very first comers to America under his charter, and at a time when the region beyond the Susquehanna was yet an unknown wilderness, the first generation had passed away, and their children and grandchildren possessed the land. This was an old settled county one hundred and twenty years ago, when Braddock's men were driven from the forks of the Ohio, and Bedford was the utmost outpost of the English. Under the peaceful policy of Penn and his followers, Bucks county was never harrassed by Indian warfare, and her settlers hewed down the forests and plowed their fields in complete security. The Quaker farmers from England found a congenial soil and climate for their vocation in the lower and central townships; and upon these, to the northward and westward, was imposed a layer of emigrants of Scotch-Irish origin, who planted their churches almost before they did their crops, and whose decendants still furnish a large percentage of our people. Then came the solid German race, composed of Mennonites and Dunkards, who vied with the Friends in their application to the arts of industry and peace; and of Lutherans and Reformers, from another part of Germany, more active and mercurial in their nature, and ready to do their part as members of the general body. The elements of population thus furnished in the beginning have since been little changed. The decendants of the original settlers are still here, and give character and substance to our population. The spirit of peace and prosperity remains, though thousands of the sons and daughters of Bucks have gone from us to plant new homes in the fertile prairies of the West.

Founded on this basis, the only change that our industrial interests have known is that of gradual but sure development. Bucks county, of all the eastern counties of Pennsylvania, is peculiarly the home of the agriculturist. Her natural advantages are not superior to those enjoyed by her sister counties of Montgomery, Chester, and Delaware, all included, like herself, in the productive Delaware valley, but in some respects they have been more largely developed. Having no available water-power or other great inducements to manufacturing enterprise, the energies of her people have been mostly directed to the various forms of agriculture. The result is the comfortable maintenance of seventy thousand people upon an area of six hundred square miles, with no concentration in large towns or cities, and with the goods of this life distributed with remarkable equality. We have no rich people, as the term goes, among us; and, fortunately, but few poor ones who belong strictly to our soil. We rest mainly upon the golden mean of comfort and competence, where every one can have enough to support him if he chooses to earn it, and no one has anything to waste. With the increase of rapid avenues to market, our methods of agriculture have undergone a change in detail, but not in general principle. Hundreds of our dairy farmers now sell milk instead of butter; they buy grain and feed from abroad, instead of being sellers themselves; the railroad car has taken the place of the market wagon; they handle dollars where their fathers were satisfied with dimes; they read newspapers and magazines, attend farmers' clubs and teachers' institutes, use the best machinery, consult the official weather predictions, and keep themselves well informed in all that concerns their particular interests. The intelligent Pennsylvania farmer of to-day, of whom the Bucks county farmer is a type, is by no means the same man that filled his place half a century ago. He is better developed in every direction. He is growing to know his importance and his needs, and in the organization of the official body which I now welcome here, we see but a just recognition of his claims by the law-making power of the State.

Although the Board of Agriculture is yet little known and understood by the people at large, its objects are so worthy that if properly supported and administered they will soon become generally appreciated, and its work will be strengthened by the approval and active help of our farmers. The manner in which it is constituted commends it to our judgement, and the efficiency with which it has been managed, with limited means, has tended to confirm the good impression. The agricultural interests of the State have long needed a better means of expression than any that existed under State or local associations. The desire of money-making has too often been permitted to obscure the legitimate work of agricultural societies, and progressive farmers have looked in vain to them as leaders in the march of improvement. Now that we have the promise of something more generous and liberal in its scope, with the Executive of the State as its official head, and a practical farmer as its active representative, we may justly hope for better work in behalf of intelligent agriculture. Every owner and tiller of the soil, who cares for the better development of his vocation and larger rewards for his capital and labor, should help forward the usefulness of the Board, according to his ability. They should give it praise when praise is deserved, contribute to its stores of information, correct its work when mistakes are made, and profit by the varied knowledge which its members and agents shall gather and spread before the people.

Believing that the presence of the Board in Bucks county, the home of agriculture, is justly esteemed by her farmers, and by her citizens of all occupations, I welcome you most heartily and cordially to her soil. I trust that your sessions here will be of valuable to all of us, that you will leave behind you the fruit of the tree of knowledge in your respective fields of investigation, and that you will take away, when you say farewell, none but pleasant memories of your stay among us.

On behalf of the Board, Vice President **BEEBE** replied as follows:

"In the absence of the Governor and President of the Board, I will say but little in reply to the kind greeting of the citizens of Doylestown, leaving it for his Excellency to make a more extended address; but I desire to say, in behalf of the Board, that we cordially thank you for the kind reception which we believe comes from the heart as well as the tongue. It leads us to conclude that we shall receive a cordial welcome and hearty coöperation from Bucks county people in our efforts. I live hundreds of miles from here, but I know something about the enterprise of Bucks county. Her methods, her improvements, are known to us because they are in advance of the agriculture of Pennsylvania at large, and enjoy a national reputation. Her educational interests and means of intelligence have also an equal fame. I feel very much at home in this place, from the fact that we have a citizen among us formerly of this town, whom we welcomed with pleasure. We have recently, in the city of Titusville, elected one of your citizens, I think from this town, to the superintendency of the public schools of that city—an honor to you and to him, because the schools of that city enjoy high praise. In conclusion, gentlemen, let me say that we appreciate your sympathy because our Board is now in its infancy. It has many things to struggle with, and it must have the hearty coöperation, aid, and assistance to succeed. In coming here we feel that we shall receive a new impulse to success."

The minutes of the annual meeting were then read and approved.

The Secretary having reported that the Legislature had, by a special resolution, authorized and directed the printing of ten thousand copies of the First Annual Report of the Board, and that of these, two thousand had been allotted to the Board for distribution, it was, on motion of Mr. **FORESMAN**, and amended by Mr. **STERLEY**,

Resolved, That the Secretary furnish each member of the Board with twenty-five copies, and each honorary member with five copies for distribution.

The reports of special committees being in order,

The committee on fence laws reported as follows:

To the Board of Agriculture:

GENTLEMEN: The fence laws of Pennsylvania are—or rather, the fence law of Pennsylvania is, as defined by the Supreme Court of the State, in Gregg *vs.* Gregg, 5th P. F. Smith, page 227 of the reports, as follows:

"All corn-fields and grounds, kept for inclosures, within the said province and counties annexed, shall be well fenced, with fence at least five feet high, of sufficient *rail* or *logs*, and close at the bottom; and whosoever, not having their ground so inclosed with such sufficient fence, as aforesaid, shall hurt, kill, or do damage to any horse, kine, sheep, hogs, or goats, of any other persons, by hurting or driving them out of or from said grounds, shall be liable to make good all damages sustained thereby to the owner of the said cattle."—*Act of 1700, vol. 1st, page 693.*

The opinion of the court in this case seems to settle the following points, and are thus defined in the syllabus:

1. The common law required the owner to keep his cattle within his close, and their intrusion on another was a trespass. This would be the rule in the State, except for the acts of Assembly, which impose duties upon the land owners other than those of English common law.

2. The owner of improved lands must fence them, both to restrain his cattle and to *shut out the cattle* of his neighbors.

3. Unless improved lands are inclosed by a fence, the owner is in default and cannot maintain trespass for damages by roving cattle.

4. The provision of the act of 1700, that the owner of such cattle shall make good all damage to the owner of the inclosure, if it be fenced according to law, implies that without such fence, there is no such liability.

5. A recovery cannot be had in any case for damage which the negligence or malfeasance of the plaintiff contributed to bring on himself.

6. Improved lands are required to be fenced, and where it is the duty of the land owner to fence his land, he cannot recover damages by stray cattle while he neglects the duty.

A fair inference from the language of the above, quoted act of Assembly, would further be that the owner of waste fields and uninclosed woodlands, would still have a right of action against the owners of trespassing cattle, had not the courts held in other cases that although the right of action existed by the common law, yet because the damages are inappreciable, they should not be noticed. And because it is better to treat waste lands as common, without limitation, to prevent vexatious litigation.

This act was passed when the country was new, when improved fields were the exception, and not the rule, when fencing material was plenty, and the only trouble was to get rid of it, when rails and logs were the only material used, when the people were poor and unable to keep their cattle without giving them the opportunity of promiscuous forage. Yet as the country improved and increased in population, and the necessity of keeping cattle in inclosed fields became apparent, this statute seems to have fallen into disuse; or was, perhaps, forgotten, and nothing was more common than to find our lower courts deciding that almost anything else was the law than that, until it was again brought to the front by raising the question in the case above recited.

The act of 1784 for the counties of Bedford, Westmoreland, and Fayette, to which I have heretofore called the attention of the Board, is entitled perhaps to be treated as a State law, as the territorial extent of these three counties at the time of the passage of the act included nearly, if not quite, all what is now called western Pennsylvania, and I feel quite sure is yet the law in any of those counties constituting the original three, unless superseded by local and special enactments. For a majority of them, however, local laws have been enacted, not only for the counties, but different laws for different townships in the same county, a condition of things, however, which I have no doubt may be found all over the State. This act of 1784 was the same in substance as that portion of it remaining unrepealed as the act of 1700, changing, however, the height to four and one half feet, allowing an open space underneath, and fixing the space between the rails to, I think, five inches. The repeal of these two acts, thereby leaving the common law in force where not supplied by local acts, is the improvement I would suggest as the only practicable measure which the Legislature could perhaps be induced to entertain at this time. The common law then, as we understand it, would allow cattle to run at large, making the owners responsible for any damage, except so far as allowing waste fields and uninclosed woodlands to be free for reasons heretofore stated in this article, and would only require owners to fence *in* their own cattle instead of fencing *out* their neighbor's. No doubt it will become public sentiment in time to prohibit cattle running at large, as has already been done in several of the States; and in a more remote time, when population shall become dense and property valuable, and all the economies a consideration; when, as in Germany, all fences will be required by law to be taken away, and all cattle to be housed. Then will the advocates of soiling rejoice.

(Signed,) M. C. Beebe.
J. Hamilton.

On motion of Mr. Moore, it was

Resolved, That when the Board adjourns it will be from half past four until half past seven, and that the Board, as a body, accept the invitation to be present at the decoration ceremonies.

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Essays and discussions being next in order, the following was read:

THE COST OF A POUND OF BUTTER.

By Eastburn Reeder, *Member from Bucks.*

"What is the cost of a pound of butter, and how may it be reduced to a minimum?"

This question is by no means a new one to my mind, and yet it is one that is difficult of a correct solution. Almost every one who undertakes to solve it brings out a different result. The Solebury Farmers' Club grappled with it as early as February, 1872, or in one year after its organization, by assigning it to one of the members.

Several members ciphered upon it, and the average of their conclusions was twenty-seven cents per pound for the whole year. Being satisfied that this was too low, I made a careful calculation, a year or so later, and came to the conclusion that forty cents per pound was an average price for the average cow. This estimate has been considered too high, but it was made when prices were higher than at present. The conditions and requisites for butter making are so varying and changing that the cost must change with them. Among these conditions may be enumerated the price of cows, the cost of feed, the value of labor, and the influences of the seasons, including both their degrees of heat and humidity. When I made my calculation of forty cents as the cost of a pound of butter, cows were selling for seventy-five dollars a piece, mill feed was worth thirty dollars per ton, and hay the same price. Now cows can be bought for fifty dollars, corn meal and wheat bran for twenty dollars a ton, and hay ten dollars per ton. The price paid for labor is also lower; so that we might reasonably expect that if butter could be made for forty cents a pound five years ago, it ought to be made for thirty cents now.

But, passing from these general considerations, I will proceed at once to an investigation of the question. I will first make the calculation upon the basis of a circular issued by the State Board of Agriculture, dated Harrisburg, April 1, 1878:

1. Twelve per cent. upon the value of the cow, (fifty dollars,) to cover interest upon capital, depreciation, and loss by death, .	$6 00
2. Pasturage during the summer at fifty cents per week, twenty-six weeks, ...	13 00
3. Grain in winter, (twenty-six weeks,) sixty-three cents per week, nine pounds and nine cents per day, ...	16 38
4. Labor, cost of implements, and interest on the cost of dairy buildings, &c., ...	18 30

5. The manure is allowed to balance the hay.	
6. Credit the cow with $7 50 per annum for skimmed milk, . . .	$7 50
7. Count the summer season as commencing May 15, and ending October 15. I have added one month to this, as we pasture six months.	
8. Commissions on selling butter, (one hundred and fifty pounds at three cents,)	4 50
Total expense, ...	$50 68

Cost of making 150 pounds of butter, per pound, ...	33
Cost of making 100 pounds of butter, per pound, ...	50
Cost of making 200 pounds of butter, per pound, ...	25

From this it will be seen at a glance that the cost of making butter depends upon the quantity the cow makes, the conditions of feed, labor, price of cows, &c., all being the same. In my answer, therefore, to the queries contained in the circular referred to, I fixed upon thirty-three cents as the average cost per annum of making butter. Mr. Willis P. Hazard, president of the Chadd's Ford Farmers' Club, of Chester county, Pennsylvania, in figuring upon this question, came to the conclusion that thirty-one cents per pound was the average price, estimating the cow to make one hundred and sixty pounds of butter per annum.

It appears to me, however, that the object desired can be arrived at more correctly by taking a dairy of say ten cows, and running it for ten years, than for a single cow one year. The cost of production will evidently be less, when calculated upon a number of cows for a series of years, than for one cow for a single year. In my next calculation I shall, therefore, assume a dairy of ten cows, and run it for ten years:

DR.

1. Interest on cost of ten cows, at fifty dollars, ($500 at ten per cent. for ten years,)	$500 00
2. Interest on same, at six per cent, ...	300 00
3. Insurance against death, at two per cent., ...	100 00
4. Pasture, (twenty-six weeks, at fifty cents per week,) . . .	1,300 00
5. Hay, (twenty-six weeks, twelve pounds per day, at one half per pound,)	1,092 00
6. Corn stalks, (one hundred and eighty-two days, at two and a half cents per day,)	455 00
7. Corn meal, (fifty tons, at twenty dollars, six pounds per day for each cow,)	1,000 00
8. Wheat bran, (twenty-five tons, at twenty dollars, three pounds per day for each cow,)	500 00
9. Milking the cows, ...	520 00
10. Skimming and care of the milk, ...	260 00
11. Feeding and care of the cows, ...	260 00
12. Churning, ...	130 00
13. Working, salting, and printing the butter, ...	260 00
14. Interest on dairy house, ($500, at six per cent.,)	300 00
15. Interest on dairy utensils, ($100, at six per cent.,) . . .	100 00
16. Commissions on selling the butter, (fifteen thousand pounds, at three cents,)	450 00
Total expense, ...	$7,527 00

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17.	By calves, (100 at $8 or 80 at $10,)	$800 00
18.	By manure, (500 loads at $2,)	1,000 00
19.	By sour milk, ($10 per cow per annum,)	1,000 00
20.	By value of the old cows—for beef,	200 00
		$3,000 00
21.	Butter, 10,000 pounds, at 45 cents,	
22.	" 15,000 " " 30 "	
23.	" 20,000 " " 22½ "	
24.	" 30,000 " " 15 "	4,500 00
	Total credits to balance expenses,	$7,500 00

NOTE.—The figures in the above calculations divided by ten show the the results of ten cows for one year; and divided by one hundred show the results of one cow for one year.

Here again we see that if we have poor cows, making but one hundred pounds of butter per annum, the cost per pound will be forty-five cents. If we have average cows, making one hundred and fifty pounds per annum, the cost will be thirty cents; if we have good cows, making two hundred pounds per annum, the cost will be twenty-two and a half cents; and if we have extra cows, making three hundred pounds per annum, the cost will be but fifteen cents per pound, again allowing the cost of cows, labor, and materials to be the same.

If the foregoing table does not sufficiently explain itself, I will offer a few words upon each point.

1. I have assumed the average cost of cows to be fifty dollars, and charge interest at ten per cent., to create a fund to re-place the stock at the end of the period; otherwise, if the butter is made and sold for cost, the original capital invested will be lost, as the cows will be worn out, or nearly so, at the expiration of ten years.

2. It is also proper to charge interest at the legal rate for the use of the capital invested.

3. The charge for insurance against death by disease or accident is at the rate it can be done for by companies honestly conducted, and where no frauds are practiced upon them.

4. The pasture is reckoned for twenty-six weeks, at fifty cents a week, which is about what the grass is worth for fattening beeves or to cut for hay.

5. The hay is calculated at twelve pounds a day for each cow, for one hundred and eighty-two days, or twenty-six weeks, and amounts to twenty-one hundred and eighty-four pounds for each cow during the winter.

6. The corn fodder is estimated at one bundle a day, at two and a half cents per bundle.

7. The corn meal is estimated at one thousand pounds for each cow during the winter, which is very nearly six pounds per day, or four quarts.

8. The wheat bran is estimated at five hundred pounds for each cow, and is about three pounds, or four quarts a day.

9. The milking of ten cows one year is estimated at fifty-two dollars, or $5 20 per cow.

10. The feeding and care of the cows is estimated at one half the cost of milking, as this is to be done but half the year.

11. Skimming the milk, washing pans, buckets, &c., is estimated at the

rates paid for that kind of labor for a proportionate rate of the time taken to do it.

12. Churning five hundred and twenty hours, or one hour a week, at five cents per hour amounts to $120 in ten years; to thirteen dollars in one year, and twenty-five cents for each week.

13. Working, salting, and printing the butter is estimated to occupy the time of one person half a day every week, worth fifty cents a week, and amounting to twenty-six dollars in one year, and $260 in ten years.

14. The interest on cost of dairy-house is charged at six per cent., as that is calculated to last a long time, and may also serve other purposes.

15. The interest on cost of dairy utensils is properly charged at ten per cent., because the wear and tear upon them is great, and they will be about used up at the end of the ten years, and the owner will receive nothing on the interest of the capital invested.

16. The usual commission of three cents a pound, on what is considered an average production of one hundred and fifty pounds per annum.

17. Credits. In estimating credits I have allowed eight dollars for the calf each year.

18. The manure is estimated at five loads per cow each year, and at two dollars per load amounts to ten dollars in one year, and $100 per cow in ten years.

19. The sour milk I have valued at ten dollars per cow a year, which is less than one cent a quart, and it is considered worth that for feeding pigs or calves.

20. At the end of the ten years the old cows will still be worth something for beef, and I have valued them at twenty dollars each.

21, 22, 23, and 24, include the quantity of butter made, and its cost, as made from poor, medium, good, and extra cows.

25. I, therefore, conclude that the average cost of making a pound of butter in Bucks county at present prices is not less than thirty cents per pound. It oftener costs more than it is made for less. This is intended to be the average for a year. Perhaps in summer it can be made for a few cents less per pound, but in winter it will cost more. I have not taken the time of year the cows come in into the account, as the dairyman will regulate that to his own interest.

The second part of the question inquires how the cost of making a pound of butter can be reduced to a minimum or its lowest point. I answer first, by lessening the cost of cows, of food, and of labor; second, by the propitious influence of favorable seasons; third, by assiduous care in promoting the comfort of our cows; fourth, by feeding them to the fullest capacity consistent with their health; fifth, by selecting, breeding, and keeping only the best; sixth, by bestowing upon the product they yield (milk) our greatest care and skill.

Let me give a case or two that came under my own observation last year, that illustrates my meaning upon this point. Farmer A had good cows—gave them good care, fed them well, and they averaged him two hundred pounds of butter for each cow per annum. Farmer B had only an average lot of cows to begin with—fed and cared for them indifferently, and they averaged him only one hundred pounds of butter per cow. With better care and better feeding they should have averaged at least one hundred and fifty pounds per cow. Farmer E had an extra cow, and although he fed her but little, if any more than did farmer A, yet his cow made him three hundred pounds of butter. What now is the relative cost of a pound of butter as made by these three farmers? I answer, that it is very nearly represented by the figures of twenty-two and a half cents for farmer A, forty-five cents for farmer B, fifteen cents for farmer E, and thirty cents a pound for farmer C, or the average farmer whose cows, feeding them as previously stated, yield him an average of one hundred and fifty pounds of butter per cow.

Mr. Reeder's essay being open for discussion, Mr. **HAZARD**, of Chester county, (secretary of the Guénon commission,) made a statement of the cost of making butter in Chester county, in which he fixed the amount at thirty-one cents, and the average yield of each cow at one hundred and fifty-two pounds per year.

In answer to the question as to how the cost could be reduced to a minimum, Mr. **REEDER** replied by advising an increase in the food and care of the cows, improvement in the quality of the butter, and increased yield of the cows.

The **SECRETARY** stated that while the estimate of Mr. Hazard of one hunhundred and fifty-two pounds per cow was, no doubt, correct, yet our best dairymen made it a rule to discard any cow not making two hundred pounds per year, and that the additional yield of fifty pounds per cow would help very much to reduce the cost to a minimum. He also stated that circulars asking the cost per pound, of both winter and summer butter, had been sent to two hundred practical dairymen in the State—that each one had been furnished with the proper items for both sides of the account. The average of these returns placed the cost of the *average* pound of butter at fifteen and one half cents for summer, and and seventeen cents for winter. The *average* selling price, clear of commission and other expenses, was nineteen and one third cents for summer, and twenty-five and three fourths for winter.

Mr. **HAZARD** directed attention to the fact that in these estimates it did not follow that the margin of profit was represented by the difference between cost and value in the market, for the former included the labor of the owner and a fair allowance for the use of the land.

On motion, the discussion was then closed, and the Board adjourned untill half past seven, P. M.

At an adjourned meeting of the Pennsylvania Board of Agriculture, held May 30, 1878, at half past seven, P. M.,

Vice President **BEEBE** in the chair.

Minutes of previous session read and approved.

The Committee on Credentials of new members reported that C. C. Musselman, of Somerset, was entitled to a membership in the Board, and that they advise that Mr. Eves, of Columbia, be admitted to the privileges of a member at this meeting, and that he produce at next meeting the proper evidence to show that his society is entitled to a bounty from the county. They also recommended that the question of the right of the Rich Hill Fair Association to a membership in the Board be left open until next meeting. Report accepted and committee discharged.

On motion of J. P. **EDGE**, the term of membership of Mr. Musselman was fixed at two years.

On motion of Mr. **KELLER**, the Board proceeded to fix the time and place of the next meeting, when, on motion of Mr. **HAMILTON**, the question was referred to the Executive Committee, with instructions to report at next session.

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Essays being in order, the following was offered:

THE ECONOMICAL APPLICATION OF BARN-YARD MANURE.

By Colonel JAMES YOUNG, *Member from Dauphin.*

The question of applying barn-yard manure to the soil seems to be such a plain one, and so thoroughly understood, that probably the one to whom the subject has been assigned will present nothing new or startling to this body. But sometimes it is well to pass over a beaten path—in fact well-beaten roads are the best if kept in order, and the ruts and uneven places repaired, and this holds good occasionally, even in the application of barn-yard manure. In traveling over this familiar road again, we will stop at three important places—when, where and how barn-yard manure should be applied.

When this nourishment to the soil should be given is a matter of no minor importance. If there is a time for every thing else, there is a time for this feature of husbandry. If thrown over the ground in the spring, manure, such as is usually used, is bound to absorb moisture; it fails to rot in time to do the most good; it has not full opportunity to fix with the soil, and it is liable to interfere with, as well as promote the growth of the crops. Assuming, then, that manure is best applied in the fall or winter, it ought not to be forgotten that in heavy clay land the application should be earlier than on light soils. And however good the soil in Pennsylvania, one application of manure will not last a life-time. It should be spread at intervals as long as crops are gathered; and the heavier the crops the greater the necessity for skillful, systematic manuring.

Where manure should be applied is well worth consideration. The kind of soil ought to be understood; its depth; the amount of manure required per acre; and the character of the land generally; whether liable to wash, or to hold all that is placed upon it to stengthen it. Manure should be applied on all land, even that given to pasture; for from the latter there is a constant drain of milk and flesh, and much of the droppings at, and and in going to and from the barn-yard; and there is nothing naturally to take the place of this loss but a portion of the droppings of the cattle, and what the rain and storms may contain. Therefore, much more is carried of than put on, and unless the land is fed from some source, the drain continues to the detriment, and finally to the utter wearing out of our once choicest meadows.

How manure should be applied seems to be the most important point of all, as it embraces when and where to apply this great fertilizer. We all believe in manure in some form. All successful farmers east of the Allegheny mountains use the gatherings of the barn-yard, (that is, that can be gathered up with the manure fork,) and we will refer to that source of supply first. With good, level land, and a good deep soil, if the land is liable to be greatly exhausted by annual drains of crops raised as crops usually are, the manure ought to be well, carefully, and evenly spread, and in such quantities as experience demonstrates is best for that particular land.

After having been spread over the land, the question arises, ought the manure to be allowed to remain on the surface, or should it be plowed under? If distributed shortly before putting in wheat, plowing under seems to be the only alternative. If after oats, the land should be plowed deep, the manure well spread on, and the ground re-plowed lightly, if there is time. If for corn, plow early in the fall, and in the winter, when you have the time, spread on the manure, and at the proper time re-plow lightly before putting in the corn. If you have not time to plow in the fall, haul on and spread the manure when you have the opportunity during the winter, and let it remain, and plow in the spring at the usual time. Where land is very hilly, unless the manure is plowed in soon after it is applied, it is liable to wash off.

The turning under of clover constitutes one form of applying manure, and a very good form, as all experienced farmers know. For what would we do without our clover to help bring up our lands? Where you can turn down in the summer a very heavy clover crop, and then prepare the same land for wheat, it is an excellent way of manuring, but it is always better to let the clover mature well before turning under than to hasten the work.

Then there is one kind of manure that can be gathered in out barn-yards, and a manure of great value. I refer to the liquid. Perhaps the best time for the application of this article on corn ground is in the winter, when you can best drive on the surface. It can be applied in many places very profitably in the spring on the grass fields and on the potatoes. In the latter part of the summer is probably the best time to apply the liquid to hay fields; that is, after the grass is cut. Then pass to the ground intended for corn, as soon as the grass is off. As a whole, you cannot go wrong in the application of the liquid. Those who have not tried the liquid I advise to give it a test, and to do so carefully and thoroughly. Within twelve months you will be joining with others in testifying to its marvelous effects, and its adaptability for rejuvenating soil along with the other barn-yard manure.

In conclusion, and by way of review, whatever you do do not fail to apply barn-yard manure. Apply it steadily, persistently, and as long as you raise crops it will help you to prosper. If you do not use it your good lands will become poor, and your poor lands will become poorer, and at last the scriptural injunction will be applied to you in another form, for from him that hath not (his soil replenished with good manure) shall have taken from him what (poor soil) he hath.

The essay was ably discussed by Messrs. Beebe, Darlington, Shallcross, and Banks, and the able handling and defense given the question by Colonel Young was much commended. It is to be regretted that the space at our disposal will not permit us to give this discussion in full.

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On motion of Mr. BANKS, Thomas Meehan, Botanist of the Board, was invited to deliver an address upon

PLANT LIFE, OR WHAT MAY BE LEARNED FROM A TREE.

(Mr. Meehan illustrated his address by rapid and explanatory sketches on a black-board, and was listened to with great attention. It is to be regretted that the address could not be preserved verbatim, but the following contains its main points, though much of its value is lost for the want of Mr. Meehan's terse and plain language.)

Mr. Meehan pointed out that observations, seemingly of little moment, were often of great importance in leading to a correct knowledge of nature's laws, and that this was especially true of those little things going on around the farmer and gardener, and which he might see every day. An important law on plant life could now be illustrated by the street trees of Doylestown.

He first called attention to the fact that the maple trees had this season produced seeds in unusual abundance. Upon those trees which produced the largest crops of seeds the foliage is now almost exhausted. Upon the black-board were made several diagrams, to be used in explaining his statements. Seed vessels are really made up of changed leaves, and hence the leaves are now absent in the seed bearing trees.

The *male* trees proceeded to make leaves at once on the disappearance of the male flowers many weeks ago, (May 30,) and they were at the present time covered with foliage, while the *female* or seed bearing trees were in such a leafless condition. We know the value of leaves to a tree. Their woody structure is made up from the atmosphere through the medium of the leaves; without leaves they could not live.

If the leaves are artificially removed from trees or plants continuously they will die. Such is the case with even the most noxious weeds. As to the strength of trees, seed producing and non-seed producing, in other words, male and female trees, it is observable that, although the female trees produce large quantities of seeds, they make quite as much wood as the male trees. Those trees which habitually produce seeds have just as large trunks, and are as tall and strong every way, as the male trees, which never bear seeds. As it is necessary to have leaves to form wood, as well as waste in making fruit, it shows that the female trees have a greater power of turning nutrition to practical use, and thus we arrive at the doctrine developed during the past few years, that the female has a greater power of endurance than the male. Besides the doctrine as exhibited in the vegetable, Mr. Meehan believes it extends throughout the entire organic kingdom. And it was one of the most valuable lessons that modern science had been able to give us from a tree.

The next subject spoken of was the formation and growth of seeds, and the laws of their germination. The laws governing the growth of seeds was treated in an exceedingly interesting manner. The tree or plant is made up of cells, and to study the laws or growth it is necessary to study the cell. The cells are identically the same throughout the plant. Some take the form of leaves and of small fibers and die every year, while others form wood and main roots, and have a continuous existence.

Why some cells should be compelled to take the form of leaves or fibers, working continuously, throughout the season, for the benefit of other cells, which, as woody structures, were permitted to live longer, could not be accounted for on any theory of benefit to the individual cells of these leaves or root fibers. They were evidently actuated by some power superior to themselves, and which had induced them to lay down their lives for the rest. It was, in fact, a republic, and leaves had to die in this community, just as in communities where the soldiers die that the nation may live. The laws which compel some cells to die early, and some to have a longer lease of life, were fully explained. The subject of cells is very important, and is necessary in considering the structure of all vegetable life. There is an inward layer of bark made every year upon trees, just the same as there is an outward layer of wood. If a cherry tree be stripped of its bark in June, when the leaves are in their fullest luxuriance, the tree will still flourish, and both new wood and new bark will be formed during the season. At other seasons of the year the process would kill the tree. The new ring of wood, which is added every year, is made by the multiplication of cells between the bark and wood, from the wood of last year.

Having thus shown, by illustration on the black-board, how wood was made, he proceeded to explain by it what was often regarded as wonderful appearances in the woody structure of trees. For instance, the rings of wood were often found thicker in some parts of the tree than others, and often they were thicker some seasons than others, or even thicker in some parts of the same season. When the new wood was made from the germination of the old cells, and was not understood, these varied phenomena seemed mysterious; but it was very simple with this knowledge. The cells, as individuals, were like individuals in animal life; they increased and prospered in proportion to health and the amount of food at command. When the cells in any one locality were in poor health, or had to scratch for a living, the annual ring just there would be very thin.

As to what were the immediate causes of injury, the observer would be generally able to judge for himself. The cross section of a common red cedar was shown on the black-board to illustrate this portion of his remarks.

The immense force which the multiplication of cells exerts was shown by the relation of several striking instances, such as the lifting of heavy paving-stones and the toppling over of heavy walls. The force which is in a manner wasted by the endeavor of the plant to lift or sustain itself was next adverted to, though from the manner in which wood is made (as already shown) tree trunks could not elongate; the simple growth force by the addition of new wood under a tree growing on a rock had been known to lift the whole tree, trunk, branches, and all, several inches. Then there was often a great waste of this force.

A vine never grew well when it was hunting for something to cling to. It spent its force, which meant nutrition, in finding something to cling to. The growth of vines is promoted by giving ample trellis room. Peas upon sticks will produce many more pods than when allowed to lie upon the ground. Grape vines grow far more luxuriantly upon trees than upon two or three wires or a single stake. The reason is that the young tendrils need the exertion of finding a place for their support. And yet this very exertion is so much robbed from growth. Thus a grape vine tendril makes a circuit every two hours, and continues thus for seven or eight days, after which it dies. But if it finds support it lives for some time longer.

After his address, Mr. Meehan answered a number of inquiries. Hiram Cornell, of Bucks county; Isaac C. Martindell, of Camden, New Jersey; Thomas J. Edge, Secretary of the Board; Henry M. Engle, of Lancaster; J. B. Smith, of Luzerne; D. H. Foresman, of Lycoming; and M. C. Beebe, of Crawford, asked for information on various subjects, and were all answered promptly and intelligently. Among the questions asked were those referring to the grafting of apple trees, the trimming of maples, splitting the bark on apple trees, the growth of beans, hops, etc., and the planting of seeds according to the signs of the moon. In response, Mr. Meehan gave some advice in regard to grafting and trimming trees, stating that splitting the bark of apple trees was often of great advantage, and said that planting according to the moon's phases was no longer taken into account by scientific men, simply because there was no evidence that the moon had anything to do with vegetable growth.

At the close of his address, Mr. Meehan requested the audience to ask any questions which might occur to them, promising to answer to the best of his ability. In response to this invitation, many questions referring to the grafting of apple trees, training maple trees, splitting the bark of apple trees, the growth of beans, hops, &c., and the planting of seeds according to the signs of the moon, were asked by Messrs. Engle, Smith, Foresman, Beebe, Martindale, and the Secretary.

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The next essay read was:

A PLEA FOR VETERINARY SCIENCE.

By HORACE J. SMITH, *of George's Hill.*

Farmers, as a class, compared with other classes of working men, are the most intelligent, and their minds are furnished with the most varied knowledge, and have likewise a capacity for putting their knowledge to the promptest use. Almost the whole range of affairs that interest mankind enlist the farmers attention, so that he is no specialist, and his activities are as varied as the seasons, or the subjects he has to deal with. But it is true, also, that the farmer is, from his comparative isolation and the necessities of his occupation, essentially conservative. Old habits, and even superstitions, survive among farmers, that die out when exposed to the light of science. Thus the blind adherence to the "signs," as rules for the governance of planting, castrating, &c., is perpetuated, and this anachronism, a miserable relic of astrology, is handed down from the time of those who thought that Sirius brought on the dog days of hot weather, or that the stars in their courses fought against men. It was because the laws of the physicial world were a mystery, that the action of uncomprehended phenomena, such as famines, murrians, human epidemics, &c., were ascribed to planetary influences or supernatural beings. A belief in witches and faries, in spells and talismans, has not been dispelled by science from the minds of those over whom science holds no sway.

The farmers isolation and conservatism has therefore prompted him to hold on to a belief in animal diseases, such as hollow horn, worm in the tail, swenied shoulder, chest founder, &c., which are proved to have no existence. It is no wonder that when the parents of the present generation were smothered in close rooms, and doomed, when ill of a fever, to the torments of the damned for want of water, that a great deal of cruelty should have been inflicted in the stables and barns. The old school of physicians, who bled their patients to death by scores, have their followers in those who treat most of all animal ailments in the same way. Some are here present who were familiar with the old practice of cutting open the backs of hogs, and inserting salt or soap as a remedy. In fact, there is nothing too disgusting or too absurd not to have been used as medicine, and the fetich of the Africans is parelleled by Americans who believe in signs or who advertise in children's cauls as a preservative against drowning. So much for veterinary science as it was, which is a misnomer; for science is "knowing," and that was sheer ignorance.

Veterinary science as it is, is the dawning of a new day, which took its rise amongst that greatest of modern nations—the French—where, in 1762, under governmental direction, the college of Lyons was instituted. From the time of first recorded history, we learn of the ravages of diseases that fell on cattle, resulting in pestilences among the people, and destructive famines, and these were especially disastrous after the great wars. In connection chiefly with the war of the Spanish succession, the plagues, it is stated, carried off in the eighteenth century not less than two hundred million head of cattle in Europe. These losses prompted the French Government, as stated, to establish the first veterinary school. The graduates from the French colleges, and from those subsequently started in

England and on the continent, have done much to give a better appreciation of the proper methods for treating animals.

The great war of North America, thank God, is over, and we have good reason to trust we are not liable to future ones, from the fact that the union of our States is emperishably assured by emphatic geographical facts. But we are liable to the insidious growth and spread of infectious diseases through other causes than war, and I beg to bring some figures to your notice which illustrate the value of our live stock.

In *ante bellum* times, when cotton was king, Helper startled the nation by the statement that the hay crop was worth more than the cotton crop. Thus we find that our oats in 1876 was reported to be worth $112,000,000, our hay $301,000,000, our corn $475,000,000, wheat $300,000,000, and cotton only $230,000,000, and the total of all other agricultural products not quite $159,000,000. Thus out of $1,577,500,000 reported agricultural products of the country, $888,000,000 (or over one half the whole) is represented by corn, oats, and hay—the food almost exclusively of our stock. Nor does this estimate include the value of our grass as pasturage by our animals, which certainly overtops very largely any exports of these three items—corn, hay and oats. Of course this statement proves that more than half our agricultural wealth lies in our cattle, and to administer to the health of this enormous aggregate, estimated in the last census at eighty-four million head, we had only from one hundred and fifty to two hundred regular graduates of veterinary medicine. To prescribe for one half that number of mankind we have by estimate seventy thousand doctors of medicine, or one doctor for every six hundred persons, while only one veterinary for forty-two thousand animals. Twenty-five years ago $600,000,000 represented the value of our live stock; to-day we lay on it a value of $1,600,000,000.

These two hundred veterinary surgeons are some of them thoroughly trained, scientific and practical men, and are centers of influence and information on their special topic. But, like all genuine articles, they have their counterfeits, and I quote an account of the treatment of a sick horse by such a quack. (See this account in the "Report of the State Board of Agriculture," page 121.)

The rapidly growing intelligence of our people discards such pretenders, and we are just about to make the practice of veterinary surgery so respectable that our young men seeking a profession will choose it instead, or in addition to, the practice of medicine. This State Board does well to urge upon our farmers and the community the importance of veterinary science, and the necessity of providing funds for the endowment of institutions in this country for training young men in the veterinary art, and upon scientists the study of animal diseases. The importance of these questions is enhanced when we remember that so many animal diseases are communicable to mankind, among which are the fearful ones of glanders and rabies. There are also from fifty to one hundred communicable affections prevalent among domestic animals that demand more or less concerted action for their extinction or restriction. To understand the nature of disease we must understand the conditions of health; and the understanding of the healthy body means the having a knowledge of its structure and the way in which its manifold actions are performed. Most valuable and practical instruction in the elements of animal physiology can be imparted even in our common schools, by means of objects such as skeletons and diagrams; provided, always, the teachers have a competency to impart the facts concerning them in an entertaining manner. Such instruction would help to raise up trained individuals, who would quickly grasp the significance and meaning of symptoms, and the uses of medicine; men of operative ability, who would prevent disease by their practical knowledge of hygiene, the conditions of health and the causes which tend to the establishment of disease. The present status of veterinary science in the United States was well illustrated at our great centennial, in which vast collection, that great show where every science, art, and trade had its place, veterinary medicine was conspicuous by its absence.

The display of Doctor Gadsden, excellent as it was for a private individual, in the Agricultural department, and the meager collection in the Army department, consisted of a few pathological specimens in the one and of farriery specimens in the other. This was an evidence that the veterinary profession, which should prevent disase, restore health, improve breeds of animals, regulate sanitary measures, protect trade in animals—in a word, defend the immense fortune of $1,600,000,000 of our country—is the only one which has been sadly neglected in America, and which has made the least progress. We have in New York the American Veterinary College, administered by Professor Liantard and an able faculty, as the *only* institution of our country capable of imparting a thorough veterinary education. There are, to be sure, in many of our State Agricultural Colleges professors of veterinary science, but the multiplicity of studies crowded into a two or four years course does not permit these isolated professors, only one to a college, to impart a thorough knowledge of their art. The distinguished Professor Law, at Cornell, does all that one man is able to do in this respect, and upholds the dignity of his profession by his high intelligence.

But it is imperative that our Government should be forced to give more recognition to veterinary science than it does, and that immediately. We have entomologists on the agricultural bureau staff; governmental entomologists studying the habits of insects in the field, the eminent Professor Baird, and others promoting fish culture; Professor Hough studying up forestry, and making *projet du loi* for Congress on that subject; and yet an industry more vital than either, on which it is not too much to say, the wealth of the country depends, is left *without government recognition, without schools, without appreciation, and even its scientific votaries laughed at, decried, and held in social disrespect.* Do my countrymen treat any other science thus? Are they wise to neglect it any longer?

If we reflect on the value of our live stock and the dangers that even now threaten us because of this neglect of veterinary science, we will come to appreciate that our nation can no longer afford to hold in contempt a merciful protective art, thus driving our young men, ever susceptible to sneers, away from its study.

The addition of a year, perhaps less, to the curriculum of our doctors, would fit them to practice veterinary medicine; and if the absurd and injurious prejudice against the andropath acting also as a zoopath were broken down we could in a short time have thousands of competent veterinary practitioners. There is no reason at all why our doctors should not enlarge their field of usefulness and their fees by attending to our cattle—at least those who live in the country. Partially with this in view, our eminent University of Pennsylvania has decided to create a department of veterinary science as soon as a proper endowment can be procured to pay the professors, secure pathological specimens, and erect a *horse* pital. I respectfully urge this endowment on Pennsylvanians and especially on the members of this State Board, as a most proper thing for them to promote. It is one of the "should be's" of veterinary science, to help to secure which, I was tempted to accept this honor of now addressing you.

The homœopathists have a well digested system of treatment of the diseases of animals, and some eminent works have been written by veterinarians practicing that system. Without any discussion of the truth of Hahnemann's theory, it is a fact that a large and intelligent class of persons prefer this system of practice, and there can be no doubt that it is as well adapted to the diseases of animals as to those of the human family. There are some homœopathic veterinarians practicing in Philadelphia and New York, and I am assured that the Homœopathic College, in Philadelphia, will add a veterinary department as soon as possible.

Besides the elevation of the popular appreciation of veterinary science, the enlistment of young men of the highest intelligence and personal character in the ranks of its votaries, and the endowment of veterinary colleges, we should have national, State, and municipal recognition of the value and importance of the professors of the veterinary art. Europe has set us an example in this respect by the enactment of laws to preserve its live stock from contagious diseases, which laws are administered under the supervision of competent veterinary surgeons. We should have national inspectors at ports of entry to prevent the introduction of rinderpest, which, though happily unknown on our continent, has cost Europe, Asia, and Africa thousands of millions of dollars. Recently in England alone it swept off stock of the value of $400,000,000 in the short space of eighteen months.

For more details of these communicable diseases see the able and startling paper by Professor Law, in the first number of the *American Veterinary Review*, and in the report of the State Board of Agriculture.

Our State authorities should provide ample means for Doctor Michener, of the State Board, to investigate local diseases, to quarantine sick herds, and promulgate the important information which comes to his knowledge. The board of health of every municipality should have a competent veterinary to inspect meat and milk, and the stables whence comes the milk, and to arrest parties having glandered horses, and to apply the logic of the pole-ax to such animals, and generally to supervise the very important interests of our citizens, which are so intimately dependent on cattle.

I have made no reference in this address to the value of poultry, and the important aid science can give us in the prevention and cure of diseases among this invaluable class of our live animals. This is due partly to the brevity enforced upon me, and partly to the fact that it has been so ably treated by Doctor Dickie in the report of the State Board.

I close, therefore, after again urging upon you the importance of endorsing the veterinary department of the University of Pennsylvania, and encouraging young men of ability to take up the profession of veterinary surgery—a profession which will soon be called upon to render most important and well paid service to the public.

After the discussion of the essay by Mr. Smith, the Board adjourned until eight o'clock.

At an adjourned session of the Board held at Doylestown, Tuesday, May 31, 1868.

Board called to order at eight A. M., by His Excellency, the Governor in the chair.

On behalf of the Board, His Excellency replied to Mr. Darlington's address of welcome, as follows:

GENTLEMAN: It is my pleasant duty to respond, on behalf of the State

Board of Agriculture, to the hearty welcome given us by the farmers and citizens of Bucks county. Our deliberations will be greatly encouraged by these expressions of regard and evidences of good will, and your support will materially help the Board to accomplish the objects of its existence.

You have shown us how a prosperous and contented community can be built up almost entirely on the results of agricultural labor. I think we may go further, and admit that the welfare of the whole State rests on the same foundation. The landed estate in all countries has been the surest safe-guard of law and order. So in Pennsylvania, in times of trial and tribulation, the authorities turn to the yeomanry of the State for the loyal power to enforce the laws. We are, therefore, happy to hear the simple recital of the fair condition of the class in which the foundations of our institutions are laid, and to find a quiet life in the depths of society, which like the deep waters of the ocean, undisturbed by the storms of the surface, upbear the treasures of civilization.

Although more widely known for its mineral wealth, Pennsylvania has many fertile valleys, given exclusively to the plow, and the extent and variety of its agricultural products do not suffer by comparison with those of any other State. If agriculture has not received the same attention and protection as other industries, it has not been because its importance was overlooked or forgotten, but because, as the natural occupation of man, it does not need the fostering care that is necessary to guard the infancy of younger industries. It grew with population and developed with intelligence—taking advantage of modern inventions to improve its methods, increase its crops and widen its market.

All this this has thus far been done by individual and local effort. But the growing intelligence of the farmers has gradually induced the belief that greater progress would result from united efforts, and the State Board of Agriculture is intended to promote organization and secure greater concert of action. The cordial reception it has met with, and the confidence it has inspired in the short time it has been in existence, lead us to hope that all the benefits anticipated may be fully realized.

We thank you, and through you the citizens of Bucks county, for this kind reception and the interest manifested in our work.

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The Executive Committee reported that in compliance with their instructions, they have agreed upon Bellefonte as the place for the next meeting of the Board, and the second Tuesday in September. On the question of the acceptance of the report, Mr. BEEBE moved to amend by substituting Titusville in the place of Bellefonte; and Mr. MOORE moved to insert Erie instead of Bellefonte. The amendment to the amendment was lost, and Mr. Beebe's amendment carried. The report of the committee as to the time of meeting was adopted.

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In answer to the question

DOES A FARM DEVOTED TO THE PRODUCTION OF BUTTER CONTAIN WITHIN ITSELF THE ELEMENTS NEEDED TO INCREASE ITS FERTILITY?

EZRA MICHENER, of Carversville, Bucks county, read an essay, as follows:

Does a farm devoted to the production of butter contain, *within itself*, the elements needed to maintain or increase its fertility?

In the consideration of this subject, several questions might very properly be considered—as quality of the soil, its adaptability to the purpose designed, and previous management, but most of all to the man who is to be the governing spirit in the affair.

The quality of the land devoted to dairying is of great importance; that is, its susceptibility to improvement, some soils requiring much more manure than others to keep up their fertility, which is partly owing to their previous management, and partly to their natural condition.

If a butter dairy had been started on the virgin soil of the West forty years ago, and all the manure carefully husbanded and applied, I have no doubt but that the soil would now be too rich to produce a good crop of oats or wheat, owing to an excessive growth of straw at the expense of the grain.

In treating of this subject, I take it for granted that we are expected to confine ourselves within the limits of the Philadelphia butter market, and embrace the counties of Bucks, Montgomery, Philadelphia, Chester, Berks, and Lancaster as the principal ones engaged in furnishing this article weekly to consumers in the city of Brotherly Love.

In these several counties there is, of course, considerable difference in the natural quality of the soil, embracing some that could not be made capable of furnishing sufficient food for its proper number of dairy cattle, up to some which comes very nearly, if not quite, being the dairyman's paradise.

We of Bucks county naturally feel proud of our birth-place, and while we are willing to concede to the others, particularly to Chester, her superiority in her natural meadows for grazing, we would like to warn her, confidentially, that she must look to her laurels closely, or Bucks will wrest from her the proud title of being the banner county in the production of large crops of corn, (one of the greatest evidences of fertility, and the dairyman's chief reliance,) and instead of the inquiry being for Chester county seed corn, the cry will go out that corn is king and Bucks county is his kingdom.

We will therefore presume that, for the purposes of our question, a man owns or occupies a farm in eastern Pennsylvania—that he is a man of energy, awake to the improvements of the times, as fast as proven to be such, but with that happy medium in his make up which enables him to discern pretty clearly the wheat from the chaff, and also to steer clear of buying patent-rights for the sale of 2.14 churns or butter workers, which all you have to do is to set them going, and when the proper time arrives put on the air brakes, and the thing is done, with time completely distanced.

The size of the farm I consider to be immaterial, but whatever its proportions, the mistake must not be made of over-stocking it, particularly in the grazing season. About six acres should be allowed, in the whole size of the farm, to one cow, and with no more horse stock than just sufficient to do the work required, as they are very expensive luxuries.

About one acre per cow is, I think, a fair allowance to make to be plowed and put in with the different grains—corn, oats, and wheat; that is one acre of each. This leaves three acres per cow for mowing and pasturage. With this arrangement, sufficient material should be raised for all the requirements of the farm. In the winter enough more cows should be added to consume all crops raised, as it is at this time that the farmer must look to manufacture the greater part of the manure necessary to mantain or increase the fertility of his soil.

We will suppose, for convenience sake, that our farm contains one hundred acres, divided into six fields of fifteen acres each, leaving ten acres for buildings, orchard, and woodland. Our cows will number sixteen, the horses four, and about eight hogs at the commencement of year, or 1st of April:

15 acres of corn, @ 60 bushels per acre,	900 bushels.
15 acres of oats, @ 40 bushels per acre,	600 bushels.
30 acres of grass, @ 1½ tons per acre,	45 bushels.

Allowing the horses, hogs, and chickens to consume four hundred bushels of corn, there remains to be consumed by the cows five hundred bushels. About twenty-five bushels are required for one cow, therefore, we must purchase four more cows in the fall of the year, to be milked and fatted during the winter and sold in the spring. What is not wanted of the oats crop for horses and hogs can be sold, and the proceeds invested in bran for the cows, yet this is not in strict accordance with the question; but is a fair business transaction, and as bran is generally admitted to be preferable to oats for dairy cows, is, I think, admissable.

The wheat crop cannot, of course, be all consumed on the farm, and must of necessity be sold to be returned to the soil in some substance rich in nitrogen. The corn fodder and hay would be amply sufficient to furnish rough fodder for all the stock mentioned.

In a recent issue of the *Country Gentlemen*, a correspondent discusses the question of "How rich land should be," and says: "That land should be just rich enough to grow the best crops. What is over this is a loss in the interest and in the manurial properties that escape, as nitrogen, the best of them, will. There may therefore be too much fertility for some crops as to cause them to grow and lodge, and make too much straw in proportion to berry—yet this is rare, and wheat will bear much more enrichment than it generally gets. After learning by test what kind of manure the land wants—and the manure of the farm usually answers the purpose—the application becomes only a matter of quantity, and the guage may be maintained by a proper rotation, using if enough can be made (which can by proper management) only farm yard manure, and what the farm furnishes in sods, green crops, etc." Further on he says: "Let it be remembered that it is manure, the coarse material of the farm, on which the *profit* of the farm depends, and that it accordingly requires careful management, so as to avoid waste, not only in the stable and around the barn (using absorbments and protection,) but on the field in the application and amount given."

We have now made provision for the feeding of the crops, and must endeavor to ascertain what elements have been carried away in the butter. Butter contains carbon, hydrogen, and oxygen, but no nitrogen, while it is stated that one thousand pounds of milk abstracts from the soil on which it was produced 5.25 pounds nitrogen, 2.03 pounds phosphoric acid, 1.80 pounds potash, 1.56 pounds lime, and .15 magnesia. If these statements are correct, the nitrogen must still remain in the milk, or as recently remarked by, I think, Doctor Salmon, the skim-milk and buttermilk contain all the elements of much value.

"E. W. S.," in discussing the subject of dairying and fertility, in the *Country Gentleman*, remarks: "That if the milk is made into butter, and the skim-milk fed out on the farm, and the butter is composed of carbon and water, which we have regarded as depriving the soil of nothing of particular value, therefore, the sale of the butter will not have any perceptible effect upon the fertility of the soil. But it will depend somewhat upon the use made of the skim-milk whether much or little of its fertilizing elements shall go back upon the land. If it be fed to pigs, that make a smaller proportion of bone and muscle than most other animals, the largest amount of phosphate of lime and nitrogen will go into the manure pile, and thence back to the soil. If fed to calves, more of its valuable elements will be used in the growth of bone and muscle. It is not safe to estimate that more than one half of the nitrogen and mineral elements will reach the soil in the ordinary method of feeding skim-milk.

"We must, therefore, estimate a loss of eight and one half pounds of nitrogen and ten and one half pounds of mineral constituents in the production of three thousand pounds of milk manufactured into butter; and if the cow produces four thousand to six thousand pounds of milk the loss will be in proportion. But there can be no question that the production of butter is the least exhaustive mode of dairying. It might also be said that if the butter is pure, separated wholly from the casein, and the skim-milk could be returned wholly to the soil, that butter might be made and sold perpetually without injury to the land. But the cow's own system must be renewed, and calves and pigs must be fed, and thus at least each cow must carry off from the soil ten to fifty pounds of valuable mineral elements, and from eight to thirty-five pounds of nitrogen per year."

Johnson says "the vegetable food by respiration is freed from a large portion of its carbon, which is discharged into the air, while nearly the whole of the nitrogen remains behind." In the food consumed, the carbon was to the nitrogen as nine to one; in that which remains in the body after respiration has done its work, the carbon is to the nitrogen in the proportion of only two to one.

It is out of this residue, rich in nitrogen, that the several parts of the bodies are built up. Hence the reason why they can be formed from food poor in nitrogen and yet be themselves rich in the same element.

It is this same residue also which, after it has performed its functions within the body, is discharged again in the form of solid or liquid excretions. Hence the greater richness in nitrogen; in other words, the greater fertilizing power possessed by the manure of animals than by the food on which they live.

According to Professor Way, the manure of a cow, both solid and liquid, was eighty-eight pounds per day, six hundred and sixteen pounds per week, and contained of ammonia three pounds, phosphoric acid, 2.40 pounds, potash, 3.57 pounds. Counting the ammonia worth twelve cents per pound, phosphoric acid three cents, and potash six cents, we have, in fifty-two weeks or one year, one hundred and fifty-six pounds ammonia, one hundred and twenty-four pounds phosphoric acid, and one hundred and eighty-five pounds potash, worth in the aggregate $33 54.

Applying the same value to the several constituents removed by a cow giving five thousand pounds of milk in a year, viz:

30 pounds of ammonia at 12 cents,	$3 60
10.15 pounds phosphoric acid at 3 cents,	30.45
9 pounds potash at 6 cents,	54
Giving a total of,	$4 44½

Allowing that only one half of the manure in the general way of farming is utilized, we still have in favor of the cow a balance of $14 55; that is, the manure has returned to the soil in valuable elements this amount in excess of what the milk has abstracted.

Some allowance must be made at the present time for these values, and also for the analysis, as the cows in the experiment were highly fed on bean meal and other highly nutritious food.

Dropping the scientific view of the subject, we will look at it in plain farmer style. Suppose that we produce from our dairy four thousand pounds of butter, and this two tons, with six tons of wheat, and perhaps three tons of pork and poultry, eleven tons, is all that is removed from the farm. Is there any man who would say, with our one hundred to one hundred and fifty tons consumed or used as absorbents, that our farm was not increasing in fertility?

In looking around, whenever we see an enterprising farmer, and compare his farm now with its condition even ten years ago, we see decided improvement, and that, too, in a majority of cases where some grain or hay is sold in connection with dairy products. True, lime and commercial fertilizers have been liberally used, but a full equivalent has not been returned for what was sold and carried away.

While, then, I emphatically give an affirmative answer to the question, I would not restrict the wide-awake farmer to the manure made on the farm, but would advise the application of other fertilizers, sparingly at first, until convinced of their practical value, whenever and wherever it suited his convenience or the occasion seemed to demand.

The progressive farmer is not content with maintaining or very slowly increasing the fertility of his soil, but is anxious each year to raise better crops, making more butter per cow, and that better than the year before, and so go on improving his farm, and at the same time himself, until he shall be regarded by his fellow men as a benefactor to the race.

The essay was freely discussed by Messrs. Reeder, Edge, Hazard, Beebe, and the Secretary. The substance of the discussion was such as to give an affirmative answer to the question. All seeming to agree, that if on such a farm all the grain raised was fed, none purchased, and the skim-milk fed to the pigs, there was no reason why the farm should not improve without the purchase of artificial fertilizers; but the question of the use of fertilizers as supplementary agents was not touched. It was generally admitted, that when the question referred to a dairy farm, from which all the milk was sold and removed, an affirmative answer was not so certain.

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The general question of the education of farmer's children was then taken up, and Doctor Franklin Taylor, of Chester county, was invited to address the meeting on the topic.

His opening remarks were in a humerous vein, on butter, politics, and a general variety of topics—all, as he said, in response to the invitation of Secretary Edge. Attacking the subject in earnest, he referred to the early founding of schools in Bucks county, to the establishment of the Agricultural Department at Washington, the formation of the Pennsylvania State Board of Agriculture, and their effects upon the general status of agriculture and the improvement of the community. A happy application of the general premises to the scientific education of farmers in their vocation was made by Doctor Taylor, whose remarks were of such a lively character as to be literally unreportable.

Doctor Taylor was followed by Governor Hartranft, by an address upon education in general, and the great importance of the power which it had in the politics and government of the nation.

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The next essay read was on

TEXAN OR SPLENIC FEVER.

By C. B. MICHENER, *Veterinary Surgeon of the Board.*

This enzootic, likewise known as Texas cattle plague, Texas fever, periodic fever, Spanish fever, or, as it is very vaguely named by some, murrain, is the subject to which I desire to call your attention.

In this disease alone the veterinarian can prove how intimately agriculture is connected with and dependent upon veterinary science. When we stop to consider the vast amount of money that has been lost by the ravages of this disease in the western States, (in 1868 alone the loss was not *less* than $500,000,) and know, that by our Legislatures passing the necessary laws, that all this vast wealth might be saved, if the advice of the veterinary surgeons was heeded, we cannot fail to see the close relationship existing between these two sciences. Agriculture cannot take her highest rank as a science while she suffers her wealth in stock to be left in the hands of chance or quacks.

Veterinary science must be acknowledged as the handmaid of agriculture, and its advices in regard to the manner of effectually stopping the spread of enzootic and epizootic diseases must be heard and acted upon in our legislative enactments before the agriculturist will be exempt from the losses which these diseases entail upon him.

I will speak under the head of "Treatment" of the manner in which to deal with outbreaks of this disease, and proceed now to give you its history as briefly as possible.

Texan or splenic fever has existed ever since cattle of the Gulf States have come in contact with herds of northern and higher countries. There can be but little doubt that if the Indians ever drove the cattle which were native to the States bordering on the Gulf of Mexico, or cattle which had become acclimated to those States, northward to higher latitudes, even before the settlement of the States, that Texas fever must have followed in their wake wherever they came in contact with other cattle. The reports which came to us for a long time from Kansas and Missouri of the existence of this disease among cattle in those States failed to be noticed, until, by the better facilities for transportation, numbers of Texan cattle were landed in Illinois, Indiana, and Ohio, where they infected vast numbers of native stock. A general fear now took the place of passive indifference, and the existence of Texas fever became a fact—a *startling* fact—to the owners of the large herds which graze on the extensive prairies of the West, as well also as to eastern shippers and buyers. Doctor James Mease speaks of this disease, in 1814, as having "long been known," and hints that possibly the "long-leaf pine country is the seat of the infection." In 1866, splenic fever existed in southern Kentucky, and Kansas, and south-western Missouri, and by 1877 it was reported as having made its appearance in Arkansas, parts of Tennessee, North Carolina, Illinois, and the hills of South Carolina and Georgia; and in all these outbreaks the passage through or presence of Texas cattle was traceable as the direct source of the malady.

In 1868, in addition to the States already mentioned as infected, we find added to the list—Ohio, New York, New Jersey, Pennsylvania, Virginia, and some parts of New England. "The investigation of 1868," as it is called, by Professor Gamgee, gives the minute history of these specific outbreaks, which, to follow in detail here, would consume too much time and weary your patience. Suffice it then to say, that of late years the disease is constantly introduced into different sections of the country. There were some cattle that died with splenic fever near Pineville, Bucks county, last fall.

Etiology.

We must look for the causes of this disease in the climate, soil, and vegetation of the gulf district. From the amount of evidence before us we conclude that these southern cattle become impregnated with a special poison, which prevails in these low latitudes, and the cattle which are born there, or introduced during the coldest weather, tolerate and retain this poison in their systems in a latent form, and only communicate it to cattle of a higher latitude, or different climatic conditions.

Native cattle, or those which have become acclimated to the gulf region, not only appear healthy, but on driving them north actually increase in weight, while all along their track they are leaving in their excretions this specific poison, which infects and develops splenic fever among cattle with which they are driven, or that pasture in the trail of the Texans within a month after their passage.

The singularity of this disease is, that while the gulf coast cattle are, to all *outward* appearances, healthy, they constantly eliminate a poison which attacks with fearful mortality cattle of a higher latitude. Texan steers which have remained north long enough to become acclimated, (and this requires from two and a half to three months, after which they do not spread the contagion to other cattle,) are, like northern cattle, subject to this infection; either by coming in contact with a fresh drove from the south, or by being driven into their former home.

If we come to hold autopsies of these *apparently* healthy Texas cattle we invariably find the spleen to be enlarged, and a number of erosions in the fourth stomach; while it is not uncommon to note fatty degeneration of the liver, and more or less bloody extravassation in the kidneys and bladder. Now and then one of these native steers may be seen to be dull and droopy, and to void bloody urine, but they rarely die from the effects of this disease alone. The essential cause of this disease then appears to be a *special* poison, generated in the gulf States, which, while it is tolerated by native cattle, becomes highly infectious and fatal when brought into contact with cattle of the northern and western States. Northern and western cattle do not, however, communicate the disease to any others, so that, although our native cattle may be dying by scores, from the passage of a drove, or a single Texan steer, we can, with perfect safety, allow the sick and healthy to intermingle. Most, if not all, cases of Texas fever which we witness every summer in our eastern States, contract the disease either in the stock-yards of the West, or from being shipped in cars or trucks which have been occupied by cattle from the South. The excrements are the medium of contagion to a very great extent, if indeed they are not the sole source; therefore, all cars which have been used for the transportation of cattle should be cleansed and disinfected before being again used. Gulf coast cattle should *never* be yarded with those of higher latitudes at the different stock-yards.

Splenic fever subsides after a few nipping frosts, and is not known to occur during the cold of winter. This establishes the fact that the *season* exerts a marked influence on this disease, prevailing during the late summer and fall, but never in the winter, and very seldom, if ever, earlier than

June. From the fact that most of the cattle which died from Texas fever in this and adjoining counties in 1874 were covered with "ticks"—*Ixodes Bovis*—some authors jumped at the conclusion that death followed as a result of the constant drain and depleting effects of hundreds of these parasites preying upon the animals. It has been pretty thoroughly proven, however, that they have nothing whatever to do with the disease in question; nor are they at all *constant* to this complaint, or *limited* to it, being found on healthy cattle and stock which have never come in contact with gulf coast cattle.

Again: if these parasites can communicate Texas fever by crawling from the Texans to the western stock, why can they not spread the infection from western cattle to other cattle?

Nature.

Texan or splenic fever is an *enzootic* whose special poison is generated only in certain localities, and only capable of transmission through the medium of the excretions and that during the warm months. It is indigenous to Texas, Florida, and certain other parts of the gulf coast States below the thirty-fourth degree of north latitude. Although some able authorities have classed this as an anthrax disease, I am forced to take exception to this view for the following reasons:

I. Cattle do not die in large numbers in the locality where the disease is spontaneous, as they do from anthrax diseases.

II. There can be no *inoculable virus* detected in cases of Texas fever.

III. Anthrax shows a decided preference for the *best* and *fattest* cattle of the herd, which splenic fever does not.

IV. The flesh of anthrax cattle eaten by man develops malignant pustule, but this never arises from eating cattle which have been slaughtered while affected with Texas fever. Splenic fever is characterized by the absence of bacteria. Nor is splenic fever analogous to malignant typhus, or typhoid fever. Its origin, development, and progress are essentially different. We do not see its counterpart in any of the diseases which affect the human family, although it is developed in the same countries where malarial diseases attack man. The *blood* and *blood glands* are the seat of the affection.

Symptoms.

Texas fever passes through four stages, viz: The *incubative*, *invasive*, *congestive*, and *terminative*.

First or Incubative Stage.

The precise length of this stage is uncertain; but by the best authorities it is estimated to cover a period of four to six weeks. During this stage the abnormal signs are not appreciable to the casual observer, nor are they, in fact, to the veterinarian, unless he note accurately the *temperature* of the body.

An increase of animal heat *alone* would not be sufficient to say that Texas fever existed, but would only indicate that some febrile disorder was about to make its appearance. Other circumstances would have to be taken in connection with this rise of temperature to diagnosticate this *particular* fever.

2. The Invasive Stage.

Varied in duration from four to seven days, and here also the principal symptom is a marked elevation of temperature, accompanied by more or less dullness. The thermometer during this stage registers from one hundred and two to one hundred and eight degrees Fahrenheit.

3. The Congestive Stage.

This lasts from two to four, and sometimes six days. The animal is dull—movements slow, and functions of body not active. Head droops, ears lop, stand apart from other cattle with arched back and legs well under the body. A disposition to lie down is soon noticed. The bowels have, as a rule, a slight tendency to constipation, and the fæces are covered with small clots of blood. The urine is high colored or *mixed with blood.* Skin is dry and harsh to the touch. There is a slight discharge of mucus from the nose and eyes. The pulse which at first was full and hard becomes rapid, feeble, and easily compressed. The head is frequently thrown out flat on the ground, or turned back on the side. The temperature during this stage gradually increases. The breathing is hurried and labored. There is evident weakness of the hind extremities, sometimes amounting to inability to rise. Nervous twitchings of the muscles are not uncommon. I saw one case in which it required considerable effort to keep one of the hind limbs quiet. It was continually flexed and extended, if not maintained in a fixed position. These animals are sometimes in a comatose condition.

4. Termination.

In nine cases out of ten the above symptoms increase in severity. Diarrhœa sets in. The temperature falls to one hundred or ninety-eight degrees. Stupor supervenes, and death ensues almost imperceptibly. Occasionally the febrile symptoms subside, the fæces assume a more natural aspect, the urine becomes paler, gait is steadier, appetite returns, and convalescence takes place. But even then two months elapse before the animal shows signs of laying on flesh. In these cases, however, gastro enteritic sequelæ often occur, which prove fatal.

Prognosis.

Unfavorable, especially during the warmest weather.

Mortality.

Taking into consideration the complications which are likely to follow, at least ninety-five per cent. of the cases prove fatal.

Post Mortem Appearances.

In native gulf coast cattle, which were apparently healthy, there is found an almost constant enlargement of the spleen, and petechial spots visible in the fourth stomach and intestines. The urine is found, sometimes, to be bloody.

In cattle which have died from the disease, we notice that they are slightly, or not at all tympanitic, *rigor mortis* is not well marked, and bloody discharges are seen at the nose and anus. The flesh is more yellow in color, easily torn, and has a disagreeable odor. The blood shows well marked lesions. It is *fluid*, though thickened in the large vessels, it is nowhere coagulated, and in the small veins and arteries it is thin and watery. The hematine, or coloring principle of the blood, is partially or wholly disorganized; so much so, that after some *post mortems* my hands and arms have not been discolored by the blood. Of the internal organs, the abomasum, spleen, and liver are principally affected. Erosions and ulcerations have been found from the fourth stomach to the anus. Ecchymosis and small petechial spots are seen on the heart, pleura, peritoneum, in the pelvis of the kidneys, and in the bladder. The last organ is frequently found distended with bloody urine. The liver is seen engorged with blood, and fatty degeneration is a frequent accompaniment. The spleen is enlarged, weighing from two to eight or nine pounds. It is of a dark purplish color, and when cut into the pulp oozes out. The trabeculæ, which are so plainly noticeable in healthy spleens, are completely broken down, and no trace of them can be found.

Treatment—A Curative.

Texas fever may be set down as one of the incurable diseases. Although a few cases recover, we are unable to state whether they recover in *consequence* or in *spite* of the remedies used. Bleeding, purging, and stimulating treatments have all been resorted to, but of little or no avail. Almost the entire materia medica has been searched in hope of finding a specific, but we are as far from it now as we were when the malady first made its appearance. Beyond the proper hygienic requirements little good can be accomplished.

Preventive.

The preventive treatment which was adopted in Missouri in 1868, is indicated by the following letter, which appeared in the *Prairie Farmer* for September of that year:

" Talk to a Missourian about moderation when a drove of Texas cattle is coming, and he will call you a fool, while he coolly loads his gun, and joins his neighbors; and they intend no scare either. They mean to kill, do kill, and will keep killing until the drove takes the back track; and the drovers must be careful not to get between their cattle and the citizens, either, unless they are bullet-proof. No doubt this looks a good deal like border ruffianism to you, but it is the way we keep clear of Texas fever, and my word for it, Illinois will have to do the same thing yet. Congress ought to do something in regard to this stock. Very stringent laws were passed in regard to the rinderpest, and yet it is scarcely more fatal than Texas fever, only the latter is not contagious among our native cattle. Texas cattle should not be allowed to cross the thirty-fifth parallel of north latitude alive."

If a few Missouri farmers, or farmers from any State, controlled our Legislatures, their interests would be better protected, and *no class of men* need protective laws as much as the agriculturist. What we mainly want in connection with Texas fever is some suggestions, which, if acted upon by the Legislature, will insure the stock owners of the north and west an immunity against the heavy losses which they have sustained from this enzootic.

Texas or splenic fever is indigenous only to the Gulf coast States, and hence our entire attention needs be turned to the disposition made of these southern cattle. It will take a very long time before sufficient attention to sanitary laws will be observed in Texas, Florida, and other parts of the Gulf States, where Texas fever exists as an enzootic, to effectually prevent its development.

Of course, to at once prohibit, *in toto*, all trade in southern cattle would *positively* put an end to Texas fever, but this is impracticable. The cost at which cattle can be raised in Texas is so low that they can be sold at much lower rates than our northern stock, and so long as this is so, there will be a demand for them which must be supplied. Could these animals be killed in their native place, and be shipped then to our great centers, the difficulty would likewise be met. Whatever measures we adopt, it is evident that complete isolation must be secured. The transportation of Texans, on foot, should be limited to the winter months, when the home stock is confined to small areas, and is not in danger of coming in contact with the droves. During the spring, summer, and fall months *all* gulf-coast cattle should be transported by steamboat or rail; that whenever or wherever landed there should be large yards, fenced in, where these cattle can be kept exclusively; that all cars or boats used for such transportation should be thoroughly cleansed and disinfected, the neglect of which should be an offense punishable with a heavy fine and imprisonment. When we have to deal with a contagious disease like this, which is not transmissible if only a fence separate the cattle, the preventive means seem simple and easy to adopt—*i. e.*, let no cattle commingle, either in pastures, roadways, or unclean trucks, with southern stock.

Through the medium of transportation, we of the eastern States are afflicted with splenic fever, to prevent which it is only necessary to allow no gulf coast cattle to mingle with others at the different stock-yards, and to thoroughly disinfect the boats, cars, and trucks on which they are shipped.

To prevent Texas fever, then, it is only necessary to avoid *immediate contact* with gulf coast cattle or their excreta.

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The following essays were then read, and the practical discussion which followed each one showed clearly not only the interest which was taken by the audience, but also the wisdom of the Board in inaugurating the plan of holding its meetings at different points accessible to the farmer of the State. At every session of the Board the audience was larger than had been expected, and its practical nature was shown by the discussions of the questions brought out by the essayists.

TEXTILE FIBER PLANTS—THEIR ADAPTION TO PENNSYLVANIA SOIL AND CLIMATE.

By Dr. J. P. EDGE, *of Chester County.*

In the discharge of the duty assigned me, I will endeavor to be brief and practical so far as the speculative nature of the question will permit. The subject, however, is a large one, and to be fairly presented should have reference to the question of imports and consumption by our State and nation.

Its supposed design is to have a practical bearing on our State industries, and the profitable employment of our labor and capital. We import so largely of textiles, either raw or manufactured, that the question is forced on us, "Can we produce them at home, or substitute others profitably?" It is puerile and degrading to our national standing that, while we have millions of men, women, and children in enforced idleness, and boundless acres of the richest of soil not productive, we shall import from foreign lands the results of their skilled labor, and leave our own in ignorance, and the consequent tendency to pauperism and general "poverty."

Fig.1.

Fig.3.

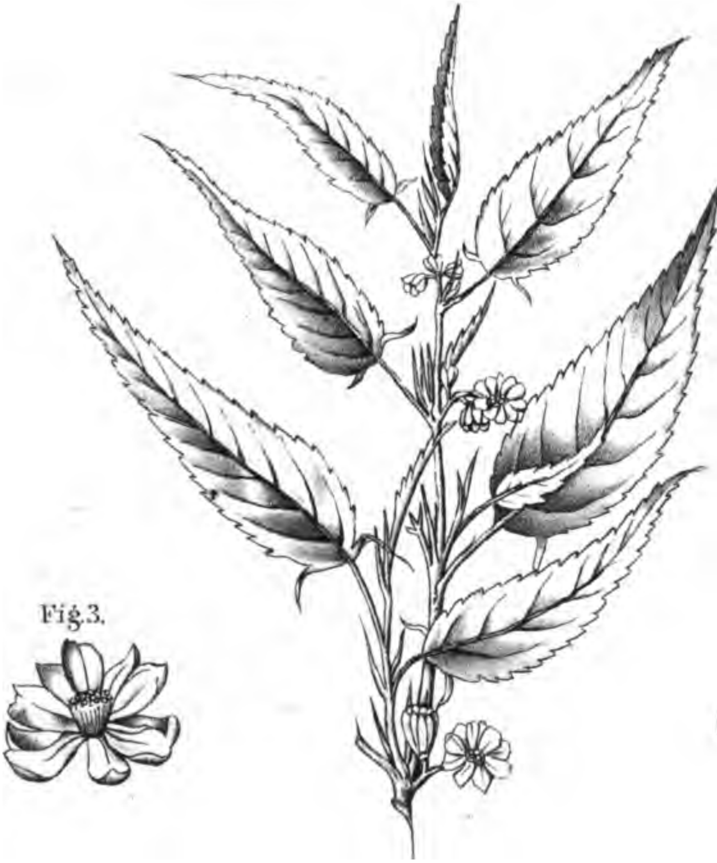
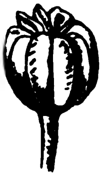


Fig.2.



CORCHORUS CAPSULARIS.
(*INDIA JUTE.*)

Fig.1. Portion of Plant
Fig.2. Ripe seed pod.
Fig.3. Expanded flower.

It is false economy and improvidence to pay to foreign nations millions of dollars annually as a tribute to their industry and thrift, when we can and should produce and manufacture at a lower cost than they, were our people educated and skilled.

In the matter of textiles, as instanced in jute, we pay in importing the cost of production in India, of shipment to Scotland, expense of manufacture, of transit to this country, tariffs, insurance, commissions, &c., &c.; and, furthermore, lose the benefits of the great and diversified employment to grow out of the industries collateral to this large increase in our production.

We have imported, in the last fifteen years, an annual average of $5,000,000 worth of unmanufactured jute, the present import being largely in excess of the average. In five years, one hundred and seventy million pounds were made into paper alone, mostly for buff envelope stock, and the asserted total of consumption in the last three years is three hundred million pounds.

A single town in Scotland has one hundred mills running, and employs twenty thousand hands in the making of jute fabrics, consuming, in 1872, one hundred and sixty million pounds of raw staple, and exporting fifty million gunny bags, a large per cent. of them to distant California for wheat sacks (at a cost to her farmers of $2,450,000, equal to one eleventh of her wheat crop, or two million seven hundred and twenty-two thousand two hundred and twenty two bushels) in which to send her cereals to India and the East. Thus, from the growing plant, the jute of India is made to circle the globe before its use is fulfilled.

According to southern testimony, the growing of jute in our gulf States has proven four times as productive as cotton or flax, and only takes one tenth the labor to raise it. Its success, as a southern product, is, therefore, assured. But can we grow jute in Pennsylvania? On a small scale, it has been matured from imported seed, and has produced a fiber of fair quality. Our summers are shown to be long enough to perfect the fiber, but not the seed; but it has been proven, that as we advance northward from the Carolinas, the fiber gradually diminished in quality and strength. It is a question to be solved only by experiment, if the northern product can be grown to compete with that of lands more favorable to it. The conditions required for its perfections are "a hot, damp climate, and a moist, sandy, or alluvial mold. Its proper latitude corresponds with that of the sugar cane, rice, cotton, &c."

In Northern India and Bengal the yield is two thousand to three thousand pounds per acre. We pay five to eight cents per pound. At the medium product, twenty-five hundred pounds at five cents, we show a yield of $125 per acre, which may be put down as remunerative.

An estimate made by S. C. Brown, of Trenton, based on the assumption that the plant can be grown in New Jersey, gives this showing: The corn crop of the State being nine million four hundred thousand bushels, at fifty-six cents, gives $5,264,000. The same acreage in jute, yielding fifteen hundred pounds per acre, would give $17,749,995, or an increase of nearly one hundred and twenty-five per cent.—$6,485,995. The foreign fiber is grown on primitive methods, and exclusively by hand labor. With our improved machinery, and our artificial manures, and the recent inventions for separating the fiber from the wood by steam, without having to resort to the wet rotting, which not only weakens it but changes its color, it is fair to assume that we can grow jute cheaper and better than to export it. Let us try! But who and how?

Much attention has been directed of late to our indigenous textiles, and some confusion has been created by the assertion that an "*American jute*" is found growing wild in eastern Pennsylvania and New Jersey. The plant alluded to is a member of an entirely different family—the malvatia—and is the abutilon aviceuræ, or Indian hemp or velvet leaf. It is thus described by botanists:

Leaves obicular-cordate, acuminate, velvety, four to eight inches long, nearly circular, with closed sinus and slender point; pedeucles axillary, shorter than petioles. Annual; stems two to five feet high; branching petioles three to five inches long; stipules subulate, caducous; flowers, yellow; carpels, about fifteen in a campanulate, truncated head, with oblique, radiating beaks at summit. Habitat, cultivated grounds; exotic; flowers in July and August.

Doctor Ezra Michener, in his "Manual of Weeds," makes these remarks: "This large, troublesome weed, being an annual, can be kept in subjection readily. But the attempt often fails from the neglect of the very small plants, which in this species frequently produce seed when only a few inches high. When permitted to mature, the plant is very prolific. It is a reproach to any farmer where it is found."

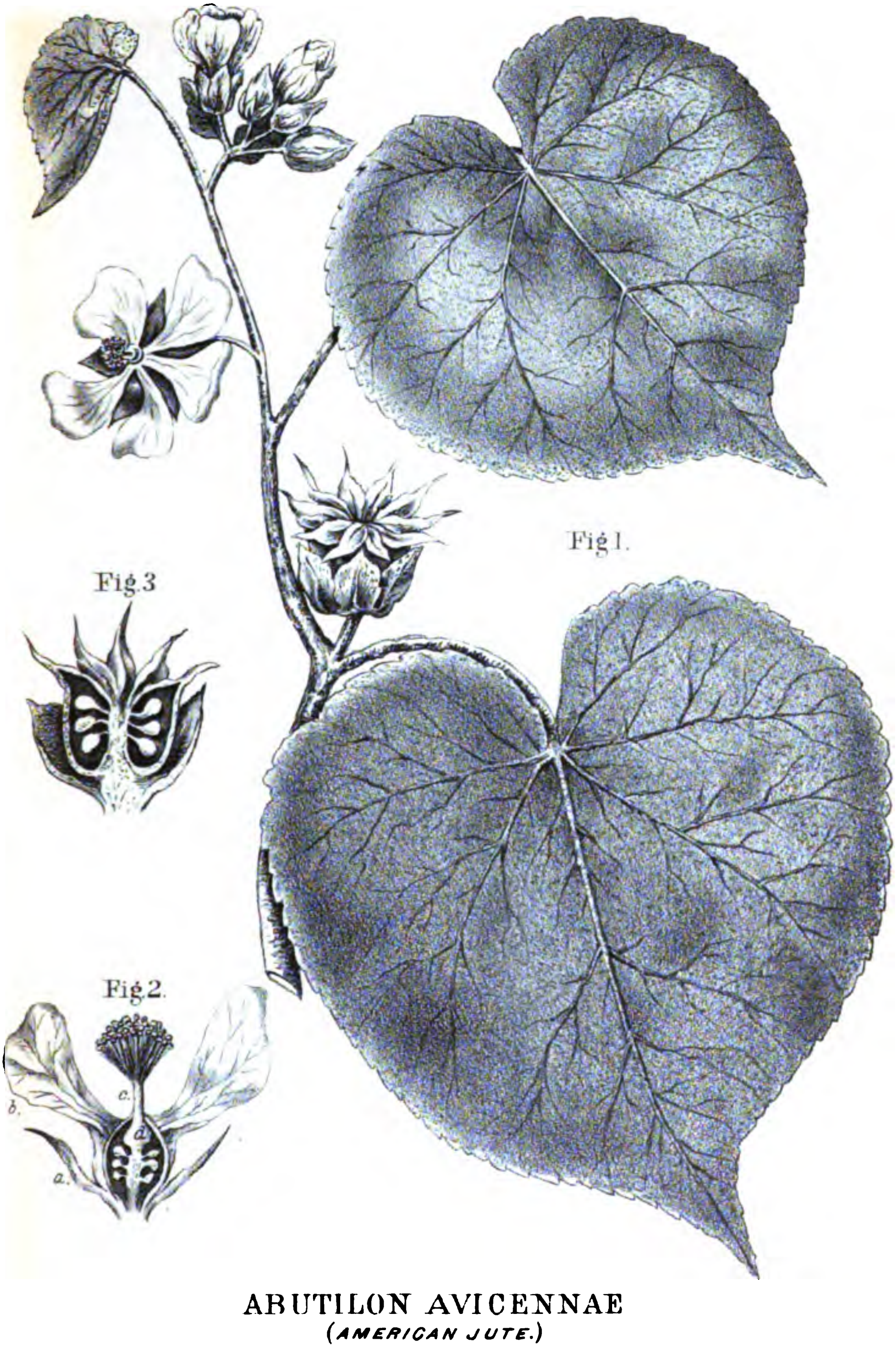
Every farmer who knows it is aware of the great strength in the bark of this weed, as in its green state he has doubtless used it for thong-straps, ox-whip lashes, halter straps, trace ropes, and a variety of other impromptu uses. It is a vigorous grower, hardy, prolific in seed, and has the merit of returning to the soil a very large leaf surface, through which it has supplied the materials of growth, absorbed by their rough velvety surface.

No extended attempt has been made to produce it in quantities sufficient for manufacturing. Mr. LeFranc, however, is now offering to those who will engage in its growth a price per ton for the green plant, which should insure the effort, and we shall not have long to wait for the test, it is to be hoped.

Specimens of the prepared fiber have been shown me, which are equal, if not superior, to the best imported jute, with the advantage of being of a better and brighter color, containing less tannic acid, and, therefore, better fitted to receive the coloring matter of dyes. It is naturally white, and when shown alongside of the imported fiber does not require a practiced eye to show their relative value, both in color and strength. Its rank and rapid growth will ensure a large yield under cultivation, and which, I suppose, would be in excess of the average of jute—twenty-five hundred pounds per acre—as the branches possess the same strength of fiber as the stalk. Twenty-five hundred pounds, at five cents per pound, gives a yield of $125. It is to be desired that experiments will be made this year in Pennsylvania, which will determine its claims for profitable raising.

The usefulness of the Indian nettle was, a half century ago, probably as little appreciated as is the Abutilon now, and it is not among improbable events that we may yet send to Europe a textile that shall compete with those of her own colonies, as we now do in the staple cotton.

Earnest attention is also directed of late to the ramie, or China grass; the vegetable silk fiber plant. The question of its successful growth in Pennsylvania, is now under discussion and trial. Persons who have planted the imported seed and the roots obtained from the South, in the vicinity of Philadelphia, have now in posession the matured and prepared fiber from such planting, which in quality is all that we can desire. The period of growth was about ninty days, and if it can be shown that the plant will mature its fibers inside of one hundred days in our climate, the success of its culture is assured. Grown as an annual, from imported seed, it may become a competitor with the product of the perennial plant of more south-



ABUTILON AVICENNAE
(AMERICAN JUTE.)

Indian Mallow, Velvet leaf, Buds, Flower & fruit.
Fig 1. portion of a plant.
Fig 2 A split flower. *a.* The naked calyx. *b.* The oblique petals. *c.* The styles with their stigmas. *d.* The ovary or seed pod Fig 3

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ern latitudes. There is no other fiber that admits of so wide a range of application, and " possessing, in a superlative degree, the qualities of firmness, strength, and luster, not found in any other fiber saving silk only."

If it shall be proven that the roots will withstand our winters, even if required to be protected by winter manuring, it opens up a possible source of immense wealth to our people. It is asserted that we may yet get two cuttings per season, yielding four tons of stalks, which, for the making of paper in the rough, will yield eighty dollars per acre. The crude fiber sells for twenty cents per pound, the bleached $1 50, and the combed silky fiber at $2 50. The latter is used in the production of sewing silk, shoe thread, fishing lines, &c., and the heavier silks, satins, plushes, velvets, fringes, &c., are largely or solely composed from it. With the aid of our improved machinery, we shall successfully compete with the world in this, as in all enterprises, and the question is, by whom and when shall the test be made?

Flax has been grown by man from the day when mother Eve doffed the fig-leaf. In the ninth chapter of Exodus, thirty-first verse, is this reference: "And the flax and the barley was smitten; for the barley was in the ear and the flax was bolled." Many other expressions occur, which show that flax had an early place in agriculture. It has been cultivated since, in almost all nations where raiments are used. My earliest and most pleasant memories, as of most Pennsylvanians of my age, are closely associated with the spinning-wheels of our mothers, the distaff, the reel, and the breaker. The pulling, rotting, breaking, and hacking for the flax was a pastime for the boys of the farm, as the spinning, reeling, and twisting was of the girls. Each family was a community in itself. It is one of my proudest recollections that I assisted to produce the linen and woolen material of my youthful wardrobe. If the farmers' sons and daughters of to-day could make the same boast in the future, it were well for them, as evidence of a return to the primitive and frugal habits of long ago.

The steam engine, the power loom and spindle, and the tyranny of " King Cotton " have subdued, yes, destroyed household production; and while *we* are fast drifting into effeminacy, the hardy toilers of France, Germany, Holland, and Ireland are supplying us, and multitudes of our people are begging for food or work.

We import $25,000,000 of flax and its products per year, and pay as duty on it $485,989. Three million acres are employed in the production of flax in Europe, while we have in Pennsylvania hundreds of thousands of acres fully suited to its growth lying unprofitable, whereas the census of 1870 shows a product of only eight hundred and fifteen thousand eight hundred and six pounds of flax and fifteen thousand six hundred and twenty-four bushels of seed. Three million women are employed in Russia in the spinning of flax by hand. What are our women doing?

In the Green Isle one-sixth of the acreage is in flax, and yet she imports one hundred and twenty thousand tons per year of raw material to supply her looms, and *exports* of piece linen alone $40,000,000, one third of which we buy.

Why not grow flax in Pennsylvania? The answer is, " unthrift and want of better systems of industrial training for our unprofitable, because unskilled, hands."

The census of 1870 assigns to Pennsyluania five hundred and seventy-four tons of hemp. It is a marvel that the figures are so small. The plant is suited to our latitude and the lines north of us. Under careful cultivation, the average yield is half a ton per acre, which, at $133 80 gives $66 90. " It is best grown in rich bottom land. Upland will do well in localities where timber shows a naturally strong soil. No trouble is experienced from weeds after the first year, and old hemp land is the best, as it is shown that hemp culture is not exhaustive, but the quality of the land increases in fertility from year to year, owing to the generous crop of leaves left on the surface, in the process of harvesting and rotting. No rotation of crops is necessary. Thecost of production is light."

The above facts are taken from the report of Secretary Gray, of the Kansas Board of Agriculture. That young State, in 1876, had one thousand four hundred and fifty acres in hemp, and the crop was valued at $79,260 68, or $54 66 per acre. As the same advantages from improved machinery apply to this, as well as other textiles, I hope we shall see an awakened interest in its culture, and the rich meadow lands of our eastern counties, now comparatively waste and unproductive, devoted to the growth of this coarse and strong textile, and thus adding largely to our wealth and progress. There are other plants native to our State, or growing in it, that are worthy of notice and of trial. But the limits of my space admonish me that I can only name one or two of them.

Another question, correlative to this, is the production of textile fiber from the mulberry, oak, and ailanthus, through the agency of the silk worm. We import an average annually of raw silk of one million forty-four thousand pounds, costing $5,558,000, to be manufactured mainly in Philadelphia and New Jersey. Why not produce this at home, and afford profitable employment, or recreation rather, to thousands of women and children, and men unfitted for severe duties? I doubt if there is a more promising field for the employment of our idle capital than in establishing individual or associated effort to develope the knowledge and practical working of silk culture. The white mulberry nowhere grows finer than in the rich limestone valleys of Pennsylvania.

The great want of our people is the industrial school. If those who are interested, in a business way, in the working up of raw textiles, would direct their minds and the minds of others to the necessity of encouraging home production by the establishment of coöperative associations to direct the will of the producer, we would early realize the condition of thrift existing among the Germans and French, resulting from a system of industrial training through associated capital and industrial schools. Nature has done everything for us, and it is for us to profit by her bounty, and by the successful examples before us, to extend our prosperity and the happiness of our citizens, and thereby build up the greatness and lasting fame of the republic.

The establishment of "working schools," as recommended by our Executive and State Superintendent of Public Instruction, would be a long stride in the right direction; and if in addition, our General Assembly, instead of lavishing vast amounts of the public moneys on institutions of doubtful merit, or that should be self-sustaining, would make liberal offers of bounties for the development of her agricultural, manufacturing, and other industrial resources, the lasting benefits resulting would make ample returns in the creation of new enterprise, and the evolving of skill, taste, and wealth.

Bounties for the production of the best textiles would stimulate and quicken the trial, while the State, in either event, would not be the loser.

Coöperative effort, the offering of State bounties, and industrial schools are the sure indices, therefore, of social independence.

RAISING DAIRY STOCK—DOES IT PAY IN EASTERN PENNSYLVANIA?

By W. G. Moore, *of Berks County.*

Is the raising of dairy stock profitable in eastern Pennsylvania, and what is the cost of a cow thus raised?

It would seem that the great majority of practical dairymen, those who have made dairying a life-long business, are of the opinion that raising dairy stock is *not* profitable. At least I infer such to be the case, for I know of but comparatively few persons engaged in dairying who give any attention whatever to raising dairy stock.

Many dairymen sell their calves as soon as they possibly can, often, in fact, to butchers who kill and dispose of the veal before it is fit to be used. They seem to think that they can derive more profit from the sale of milk which would be consumed by the calf than from the sale of the calf itself, at four weeks of age; or what the calf might be worth to them on becoming a cow. Probably, also, they are kept too busy in attending to their cows and milk, without having time or sufficient help to devote to other matters, and in fact have not the room, in many instances, for any other animals but cows, except, of course, as many horses as they may need. But without answering whether or not it would be profitable to dairymen to raise their own stock, I do think that the raising of dairy stock *is* profitable to the farmers of eastern Pennsylvania; more especially when they raise well-bred cows. As mentioned by me in a previous essay, our farmers set a great value upon barn-yard manure, and make it an object to keep and raise live stock not only for the milk and butter derived from cows, and having their work done by horses, or of converting said live stock into money when it arrives at a marketable age, but also for the equally necessary purpose of converting their straw and fodder into manure. For without plenty of good rich manure, the farms of eastern Pennsylvania would soon become barren and valueless. Now, as it is necessary to keep and raise live stock on a farm, I believe the raising of cattle to be more profitable to the farmer of moderate means than any other kind of stock, as the original investment is smaller, and he can turn his money oftener and has less risk to run.

In the section of country in which I reside, fully one half of the farms are cultivated by tenant farmers on the shares. That is, the owner leases to his tenant upon the following conditions: The tenant is to keep a limited number of horses and cattle, to do all farm work, and keep fences, &c., in repair (the owner, however, furnishing the rails and posts,) and the tenant in most cases paying one half of the taxes. As an equivalent for his services, the tenant is to occupy a house, rent free, keep pigs and poultry, feeding them, of course, at his own expense, is to receive one half of all the grain raised on the farm, all the hay necessary for feeding his stock, and is expected to convert all the straw and fodder into manure. Sometimes the tenant is allowed to sell a certain quantity of hay, on paying one half of the proceeds to the owner of the farm. Their agreements also generally require them when they quit, at the expiration of their lease, to leave the same quantity of hay upon the premises which they found there upon taking possession. Now, one of the principal ways for the tenant farmer to derive profit for his year of toil, besides what he may get for his milk, butter, eggs, poultry, &c., especially as one or the other of the grain crops has partly failed for several years past, is by raising live stock.

This class of farmers generally, when they first commence farming on their own account, buy their live stock and farming implements at public sales on a credit of nine to twelve months. As they only need from two to eight horses to do their farm work, and are required to keep enough stock to eat the hay and fodder, they purchase from six to eighteen head of cows, (there are very few sheep raised in my neighborhood), and as calves grow up and become marketable as cows from one to three years sooner than colts foaled at the same period become marketable as horses, these farmers after once getting a start are soon able to raise and dispose of a number of cows every year, and if fortunate with the first year's grain crops, can pay off considerable of the original investment. Of course a certain number of calves dropped upon the farm during the year will be males, but they are either raised for sale, or the farmer's own table use, or for stock purposes, or disposed of to the butcher, and I do not think would change the figures of the general result, unless perhaps to increase the farmer's yearly profits in the following manner. All the beef, veal, and mutton purchased from the butcher costs him nearly double the amount that his own raising and slaughtering would. To avoid this many farmers exchange quarters of veal, beef, and pork with their neighbors, and thus each of them is at intervals supplied with meat at first cost. To show that it pays the tenant farmer of eastern Pennsylvania to raise dairy stock, I do not think it necessary to give figures. The general argument will bear me out. Generally, however, a very ordinary stock of cows is raised by these farmers, and thus they do not realize much over half what they might did their means allow them at the outset to invest in a better class of stock. Now, if it pays the tenant farmer here to raise dairy stock, the same line of reasoning would, I think, make it profitable for owners of farms which they themselves cultivate; and, in fact, they should realize a larger profit than the tenant farmer, as they are generally able to invest in well-bred stock. Raising colts might, perhaps, afford a larger profit than raising cows, but there seems to me to be this difference, that there is always a demand for good cows, whilst for several years past good horses (to say nothing of common ones) have been a very slow sale. At the present low price of farm produce it seems almost impossible to make farming or stock raising very profitable in eastern Pennsylvania.

Mr. Isaac McHose, of Reading, a gentleman of great business experience, and who owns a farm several miles from that city, keeps a dairy of twenty Ayrshire cows, and wholesales the milk produced by them to a firm who retail the same in Reading. Mr. McHose informed me that he advertised two good common cows for sale. His price was fifty dollars per head. A number of purchasers came to look at them, but would not buy at those figures, although he had no trouble in disposing of one Ayrshire cow and one heifer at two hundred dollars, and says he can dispose of his Ayrshires at similar prices faster than he can raise them. He says it costs him from twenty to twenty-five dollars per year to raise them. I suppose they must receive extra care and attention, but even at those high figures for raising it should certainly afford a handsome profit.

Mr. John Moyer, a practical and progressive Pennsylvania German farmer, who owns and cultivates a large farm in my neighborhood, and whose farm buildings and fences are models of neatness, keeps from eight to ten head of dairy cows, and feels sure that it pays him to raise his own stock.

Messrs. H. & B. F. Taylor, of Charming Forge, the owners of several large farms several miles distant from me, have raised annually a large number of colts and calves. They give it as their opinion that it is profitable to raise dairy cows. The following is my estimate of the cost of a cow thus raised:

FIRST YEAR.

Value of milk until calf has learned to eat,	$3 00
4 bushels of corn and cob meal @ 45c,	1 80
4 bushels of bran @ 18c,	72
5 months' pasturage @ 50c,	2 50
500 pounds hay @ $10 per ton,	2 50
Cornfodder,	1 50
Salt,	20
First year's total,	$12 22

SECOND YEAR.

6 bushels corn and cob meal @ 45c,	$2 70
8 bushels bran @ 18c,	1 44
5 months' pasturage @ 60c,	3 00
1,000 pounds of hay @ $10 per ton,	5 00
Cornfodder,	2 00
Salt,	40
Second year's total,	$14 54

Mr. John Moyer, whom I have referred to, has all his heifers coming into profit at two years of age, so that their cost would be twenty-six dollars and seventy-six cents, and they would be worth probably from thirty dollars to forty dollars, although he has sold them at from sixty dollars to seventy-five dollars. I would have them become cows at about two and one half years of age, when the cost would be about thirty-five dollars, and they should be worth from forty dollars to fifty dollars. The Messrs. Taylor do not allow their heifers to come in profit before three years of age, believing that they are stunted in growth by having them in profit at an earlier age. Some farmers feed their calves on chopped oats and wheat bran, and feed all hay or all fodder. Some do not pasture at all the first year. Others pasture only at night. The latter is not very advisable in the section of country where I reside, on account of the number of worthless curs running around loose, and which might worry the calves to death. I have given the figures on corn and cob meal and bran because that was the feed used for two heifer calves which I am now raising. During the last winter the calves got very little hay, but plenty of cornfodder, which had previously been torn to shreds by the use of Lee's fodder cutter.

I have made no charge for labor or attendance in raising the calves, as I think the manure fully pays for that.

INSECT DEPREDATIONS—THEIR EXTENT AND REMEDY.

By HENRY M. ENGLE, *of Lancaster*.

That all the tillers of the soil should be more familiar with their insect enemies and friends will no doubt be conceded, but to select as your essayist one who has given this matter so little attention seems altogether out of place, and he trusts that all errors in his attempt to discharge the duty assigned him will be overlooked.

This subject is so extensive that even a practical entomologist could not in one short essay do more than merely enter the threshold thereof. It has been recently stated by some writer upon the subject that the value of crops destroyed in the United States by insects would in five years pay our national debt. I have no data from which to verify the correctness of this estimate, but would readily concede it to be within bounds, for their name is "legion," and their number, if not incalculable, is at least incomprehensible.

We will simply refer to a few of the most prominent of our insect enemies, and will mention them by their common names, because of our inability to Latinize them. By the most prominent we do not wish to be understood as meaning the largest, for the greatest damage is often done by the very minute insects, and it is their very minuteness that tends to so much indifference on the part of many whose crops frequently suffer largely from their depredations.

If all destructive insects were as large, and did their work as openly, as the Colorado beetle, or the Rocky Mountain grasshopper, their ravages would be more determinedly counteracted. The latter, however, we hope will never cross the Allegheny mountains.

Of all farm crops grown in this country grass is estimated of greatest value, and has at least in this section of country but few insect enemies. The wheat crop, however, we may consider of greatest importance, and this has in some seasons been greatly injured by the ravages of insects, and by none more than by the Hessian fly. Although a foreign intruder, it has found its way into almost every State in the Union, and the worst feature of the case is that thus far there has been no effective remedy found to destroy them, or scarcely to counteract its ravages. Late sowing is advocated to prevent its multiplying rapidly, but this remedy very frequently amounts to little, for when it is on hand only an unfavorable season for its reproduction will keep it in check. It has been claimed by some that it multiplies rapidly in wheat that grows up between harvest and seeding time.

The field weevil formely curtailed the wheat crop largely in some sections, and the only counteracting remedy seems to be the sowing of varities of wheat that mature early. In some parts of the United States, the chinch bug is very destructive to wheat, as well as other crops, but our State has suffered but little, if any, from this enemy. Indian corn is almost entirely exempt from insect depredations if we except the "cut worm" in its early stages. This enemy sometimes makes great havoc, but fall plowing in this latitude is generally a preventative.

The Colorado beetle is one of our most important insect enemies, yet it may, to some extent, prove a "blessing in disguise," since the application of Paris green is all that is necessary to keep it fully under control. I trust I will not exaggerate by saying that we now raise better crops of potatoes, as they require closer attention than formerly. They are also planted at more appropriate seasons, *i. e.* early and late, instead of mid-season, as was often the case heretofore. The application of fertilizers with Paris green, such as gypsum, lime, ashes, &c., also has a tendency to improve the crop.

The green cabbage worm has been very annoying as well as destructive for several years, and requires close attention to keep the crop uninjured. Various remedies have been applied against them, but withal there is much loss from their ravages. Wood ashes, quick lime, salt, bran, and other ingredients have been applied with more or less effect, but in our experience not altogether with satisfactory results. Pieces of board or lath placed between the rows a few inches from the plants will attract the worm to pass its chrysalis state, and many can be captured in that way, but more will escape. Hand-picking is a certain remedy so long as the cabbage is small, but very tedious and uncertain when heading. For several years past I have paid boys a certain price for all cabbage moths captured on my grounds. This season I offered a penny a piece for all captured before the 1st of May. I invested about two dollars, since which time I have seen very few. I think the brood that survived the winter was almost entirely destroyed, and scarcely a sign of worms can thus far be seen. I consider it the best preventative and most satisfactory method that I have yet tried.

The striped cucumber beetle is one of the most provoking of all insect enemies, not that the crops which they destroy are of so much value—except melons, in some sections—but they often come so suddenly and in such numbers that a lot of plants, be they ever so promising, are frequently destroyed in less than twenty-four hours. After once attacking the plants they are not easily driven away by any application; but they may occasionally be prevented by dusting the plants with slaked lime, wood ashes, or even road dust. Our latest and most effective remedy is the same as for the Colorado beetle, *i. e.* Paris green applied in advance of their attack.

As regards insect depredations upon fruit crops, the codling moth and curculio are most prominent. The former, perhaps, destroys more fruit than all other insects combined; not that the curculio is less destructive in its way, but because apples are more generally grown in our country than any other fruit. The curculio also attacks pip in the absence of stone fruits, while, on the other hand, the codling moth also propagates its kind in stone fruits. The latter operates only at night, and many can be destroyed by placing a light over a tub of water, or filling jars or wide-mouthed bottles with sweetened water, and hanging them on the trees; but some friends, as well as enemies, will be captured by these methods. Many of the larvæ may be destroyed by tying hay-bands, canvass, or old clothing around the stems of fruit trees, in which the larvæ will seek shelter to pass the chrysalis state. These must be removed and burned, or the larvæ crushed not less than once in twelve or fourteen days, commencing not later than the 1st of June. By picking wormy and fallen fruit continually, or having stock in the orchard that will eat it, a large proportion of the larvæ will be destroyed, which would otherwise multiply rapidly. For the destruction of curculio there are many methods advocated, but thus far none well established, except the jarring system, properly and regularly attended to. The hanging of corn-cobs, saturated with coal tar, upon the trees, is claimed to keep off the enemy, but I have noticed, this season, upon a neighbor's plum tree, where the "little Turk" has left his "crescent," quite close to the saturated cobs. The most plausible method, aside from jarring, would seem to be the burning of coal tar, turpentine, pitch, or any other substance under the trees that will make a sooty smoke, which adheres to the foliage and fruit. This method, repeated as the rains wash away the soot, is claimed to be an effectual remedy.

Caterpillars are very destructive some seasons among fruit and other trees, and we believe no effectual remedy has thus far been devised except by destroying the eggs, which we find deposited in crotches of the trees and branches, and covered with a white web. If neglected at this stage the next best remedy is to follow the trees and destroy the nests in the first stages of development, which may be done with a pole with some sort of swab on the end saturated with coal oil.

The familiar rose bug, (by some called "June bug") has been very annoying some seasons by destroying the foliage of some trees, more especially the cherry. Birds or domestic fowls seem to have no relish for it, though it is easily captured. One of the easiest methods of destruction is to shake or jar the trees on a cool morning and trample the insect under foot.

The various species of aphis do far more injury to trees and plants than the casual observer imagines, as they operate under as well as above ground, and their capacity to multiply with almost incredible rapidity makes them a very prominent enemy. Wherever they can be reached, however, the smoke or liquor of tobacco is sure death to all of them.

Leaf-hoppers, or thrip, as they are generally termed, play an important part in injuring the foliage of trees and shrubbery, and especially of the grape. Occupying the under side of the leaf, and as the mature insect will fly, it is very difficult to destroy them or even keep them in check. A dry season seems to be favorable to their operations.

These are some of the insect enemies that are quite common and figure largely in reducing and in many instances entirely destroying the brightest prospects of the farmer, and yet how few, comparatively, of the tillers of the soil who think it worth while to make themselves acquainted with the habits of these their certain enemies. If those directly interested in this matter would apply part of the time devoted to severe muscular labor to the study of entomology, their success would be more certain, with less wear and tear both of body and mind.

MACHINERY ON SMALL FARMS.

By ISAAC H. HILLBORN, *of Newtown.*

Has the introduction of labor-saving machinery been an advantage to the farmer of small areas?

One of the first points presented for consideration in this question is, what constitutes a "farmer of small areas?" This has such varied meaning in different localities that we found no little difficulty in deciding. In fact, we have not decided. In some sections of our country we find that a farmer who tills one hundred acres is considered about in the same standing, in relation to areas, that another one is, in a different locality, who has but twenty or twenty-five acres under his control. Although these different local meanings exist, and have some bearing upon the decision to be arrived at, we yet feel that an affirmative answer must be given to the assigned question.

The introduction of labor-saving machinery has not been a thing of a day, or a year; but has been the work of ages, and in a measure has been the result of a necessity. In ancient times it was but needful to tramp the grain into the soil by the hoofs of the cattle, and later but to loosen the soil by means of a crooked stick fastened to the tail of the patient ox. Then, could all the corn needed be ground by pestle and mortar; but, in lapse of time, as population increased, more land must be tilled, more grain must be produced, and more bread must be made. To accomplish these results gave rise to the necessity of labor-saving machinery. Then was the rude plow fashioned, with curved mould of wood, and share of same material bound with iron. This was a labor-saving implement of modern times, yet who would think of using it now?

As pestle and mortar were found insufficient, they were re-placed by the water-mill, with all its modifications and improvements. As the sickle and scythe in the hands of the sturdy farmer were found unequal to the task allotted them, then came the mower, reaper, binder, and rake. The next akin to sickle and scythe—the flail—was hung upon some forgotten peg, and the thresher and cleaner took its place. The labor of seedtime and harvest has been made but a pastime. What once was the laborious task of days for all the hands upon the homestead is now performed by the lads and lasses of the household, as though it were but recreation. What once required the muscular force of all the sturdy laborers that could be mustered is now accomplished by half-grown boys with the aid of a span of horses, which otherwise would have been idle. Not alone in field and workshop has the influence of labor-saving machinery been felt. The burdens of the housewife have in a measure been lifted from her shoulders, though not in the same proportion as those of her husband. The washer, wringer, and the sewing-machine have each taken their part of the household labor, and performed it well.

Now, without further trespassing upon your time in descanting upon the changes wrought in field and household by these inventions, let us at once give to the question an unqualified affirmative answer. The interests of the agriculturists of our country, whether of large or small areas, are so blended with those of other occupations, that they suffer or are benefited by whatever tends to injure or improve those of other callings.

The interest of the small farmer is precisely the same as that of him who tills his thousands of acres. His productions are of the same character and raised for the same purpose. His family have the same labor to perform, and expect the same return for that labor, though in a less degree. They have the same wants to supply and the same desire to receive a profit upon their labor, that they may be able to save a penny for the rainy day, and if by the aid of some labor-saving implement they are able to perform a greater amount of work in a given time, they will certainly receive a commensurate return for that labor. They will thus be enabled to extend their efforts in a wider field, and if the required funds are not in hand to purchase more acres, there are often opportunities offered to cultivate part of an adjoining farm, and the profits thereof must be entered upon the credit side of the machinery account. It is by well directed efforts of this character that the broad prairies of the West have been made to yield such bountiful harvests, and to contribute so largely to the supply of the wants of an ever increasing population.

By the proper application of improved machinery has the product of mines been increased and the commercial interests of our country been extended. In all these the farmer of small areas has an interest in common with the rest. We do not here assert that every tiller of the soil should be supplied with all the implements that might be mentioned, but some at least will be needed whether his lot be cast upon our eastern slopes or the broad western prairies.

It is known that in this section of the country, either from the exhaustion of the soil or from other reasons, that to insure a good return for the outlay of seed the land must be more thoroughly cultivated than in a former period, and to accomplish this it becomes a necessity to introduce improved methods of tillage. To attempt this by means of hard labor would render the outlay (even at present reduced prices of labor) so great that the profits would be absorbed before the crop was produced. Arithmetical illustrations of this might be given in detail, but would perhaps not prove interesting or instructive here.

Upon every farm, whether large or small, there is a given amount of labor to perform. There are household duties that must not be neglected, and family relations that must be sustained by the heads of the household. These all require time, and thus time to them is money. Whatever increases this to them is profitable. Whatever tends to lessen the burdens of the mother in her manifold duties to her family—whatever enables her to devote more time to the proper training of her children, must in the end prove valuable, both to the immediate members of the family and to society. Whatever will enable the father to spend an occasional hour at noonday or eventide, in imparting a useful lesson to his son in botany, astronomy, or political economy, if you please, must be an advantage.

And what is contributing to these more largely than labor-saving machinery? Nothing. Who knows but what the destiny of many a young man of humble birth has been so changed by the care his parents have been enabled to bestow upon him, through the extra time furnished them by the introduction of a sewing machine into the family, that they may yet rise to positions equally honorable to that so worthily filled by our presiding officer.

Fathers and mothers, if you would have your children emulate the example of great men, you must train them for the task, and to do this takes time.

Have we digressed? If so, we must ask to be excused, for we know full well this is our failing; but our subject is so full of meaning, so interwoven into all the ramifications of society, that we find it hard to keep constantly in view the interest of small farmers alone.

We cannot do it. But lest we should trespass, we will close by thanking you for your kind attention.

On motion of Mr. MOORE, the subject for general discussion,

SHOULD LARGER BOUNTIES BE PAID TO COUNTY AGRICULTURAL SOCIETIES,

was then taken up, and opened by the following address by Colonel J. L. STICHTER, of Reading:

MR. PRESIDENT AND GENTLEMEN: We have come down from old Berks with the greetings of our agricultural and horticultural society, and to assure you of its sympathy and coöperation in the great work of promoting agriculture. We heartily indorse the creation of the State Board of Agriculture, and wish it abundant success. It is to this centralization and associate effort that we must look for the progress, which will elevate this State to an equal position in agriculture and horticulture with her sister States.

Berks is making giant strides in all departments of the farm, under the stimulating influence of our Society.

We are among the first of the counties to move in the matter of getting State bounty. We have stimulated fruit growing to an extraordinary degree—nearly forty-five thousand peach trees having been put out, which are now in vigorous growth.

We are making an effort in the direction of improving stock. We urged the beautifying of homes, and we have brought to the notice of our farmers the importance of raising tobacco and sugar beet.

Our community takes deep interest in the welfare of the agricultural society, and we have every assurance that our fall fair will be the most brilliant ever held in our county.

California owes her present advanced position in agriculture to the liberal bounties she gives to her agricultural societies—giving $5,000 to the State society, and a handsome sum to each of the county organizations.

Pennsylvania has, in a measure, lost sight of the productions of her soil, mainly in consequence of her mineral resources; and now, as coal and iron do not pay, let us with united effort, induce our Legislature to grant liberal bounties to the agricultural and horticultural societies throughout the Commonwealth.

Although this great subject has been considered second in importance on the part of the Legislature, we believe the time is at hand when the best minds of the State see the importance of fostering this interest. We desire particularly to express our high appreciation of the lively and active interest taken in agriculture by His Excellency, John F. Hartranft, Governor of the State.

The discussion was ably carried on by Messrs. Zerr, Ralston, Stichter, Engle, Foresman, and Beebe.

The act now in force in this State, relative to bounties to county societies, was read by the Secretary, and commented on by him.

On motion, the chair appointed Messrs. Moore, Banks, Mullin, Foresman, and Fahnestock a committee "to take into consideration such legislation as may be required to promote the general interest of agriculture in Pennsylvania, including increased bounties to county agricultural societies."

On motion of Mr. ROLAND, of York, they were also instructed to consider the propriety of releasing the property of county agricultural societies from the payment of taxes, and report at the September meeting of the Board.

Adjourned to meet at one o'clock and forty-five minutes, P. M.

At an adjourned session of the Board, held May 31, 1878, at one o'clock and forty-five minutes, P. M.

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The commission appointed, at the request of this Board, by His Excellency the Governor, to examine into and report upon the value of the Guénon system of selecting milk cows, made a preliminary report.

By special request, Captain MORRIS then explained the system, illustrating his remarks by a series of well executed drawings, showing the different markings on which the system is founded. Mr. Morris proved that he not only thoroughly understood the system himself, but could also explain it intelligently to others. (See proceedings of Titusville meeting.)

The preliminary report of the commission was ordered to be inserted in the quarterly report of the Board.

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On motion of JOHN P. EDGE, the thanks of the Board were tendered to the citizens of Doylestown, and especially to Henry T. Darlington, for the kind manner in which they had been received by them.

Adjourned to meet at Titusville, Tuesday, September 10, 1878, at three o'clock, P. M.

SEPTEMBER MEETING.

At a meeting of the Pennsylvania Board of Agriculture, held at Titusville, Tuesday, September 10, 1878.

Board called to order at three, P. M., by Honorable M. C. Beebe in the chair.

Present Messrs. Moore, Banks, Beebe, Hamilton, Smith, Roland, Foresman, Keller, Yeakle, Wilson, Eves, Morris, Culver, Enger, Musselman, Sterling, George, and Secretary.

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His Excellency Governor Hartranft then took the chair, and Mr. H. C. BLOOS addressed the Board as follows:

Governor HARTRANFT: I have been requested, on behalf of the Oil Creek Valley Agricultural Association, to extend to you and the other officers and members of the State Board of Agriculture a cordial welcome at the opening of your session in this city.

We take great pleasure in having your honorable body, representing fifty counties in the Commonwealth, composed of gentlemen distinguished in private and public life, and in the walks of science, pay an official visit to this comparatively new section of the State.

This is a busy, somewhat exciting, and eventful week in the annals of Titusville. In another hall at this moment, the Producers' Grand Council are holding their regular monthly session, and delegates have come here from all the oil districts, several hundred strong, to concert measures for the benefit and relief of the great commercial industry which they represent. To-day the veterans of the Eighty-third regiment of the Pennsylvania volunteers have assembled in this city for their annual re-union; and last, but not least, is this important meeting of the State Board which is doing so much every year to enlighten, guide, and advance the agricultural interests of Pennsylvania.

We feel highly favored to have had the county of Crawford selected out of the sixty-six counties of this Commonwealth as the place for holding your deliberations. There are a great many older counties than ours, and richer counties, and counties of more historic associations. Still, Crawford county occupies a very respectable rank. There are only eleven counties in the State that contain a larger territorial area, or even a larger population, and of the thirty-two cities of the State, nearly half of them are smaller than Titusville, and few, if any of them can exhibit such a percentage of increase in growth—for in 1860 we numbered but four hundred and thirty-eight persons, while at the close of the next decade, according to the census of 1870, we had attained a population of eight thousand six hundred and thirty-nine. Of course, it was the discovery by Colonel

Drake, nearly twenty years ago, of petroleum oil in the subterranean sand rocks in the suburbs of the city, that alone could account for this exceptional growth. It was this new source of business prosperity affecting all classes alike, as the rain and the sunshine descend on all; it was this sudden amassing of competence and wealth which built up and beautified our city, and which has rendered it one af the most substantial and attractive in the State, with its miles of sewerage, paving, water, and gas pipe, and in which, best of all, nearly every man of business, every mechanic, and laboring man is an independent freeholder.

But it does not satisfy our ambition that our city is the favorite residence of most of the fortunate and successful oil producers, whether their field of operations is fifty miles to the northeast, in McKean county, or about the same distance to the southwest, in the Clarion and Butler districts. It does not satisfy the measure of our wishes that our industrial establishments turn out barrels, or construct tanks, stills, oil well supplies, or machinery. We are persuaded that our people can engage in other things quite as profitably in the long run, as in the pumping and refining oil. We have felt the importance for some years, as a community, of introducing and fostering other manufactures, and of developing and improving the excellent agricultural resources of the surrounding region. We think that is capable of demonstration that this section holds out the strongest inducements for many trades and lines of business hitherto overlooked and somewhat neglected, in consequence of the all-absorbing oil excitement. I allude to woolen and paper-mills, tanneries, agricultural works, cordage, furniture, and cheese factories. Here are the forest products, the raw material, the pastures always green, the streams that are never dry, water power, cheap labor, a home market and railroad facilities for shipment.

But it is more pertinent to this occasion, perhaps, to say that the dairy interest and stock raising are better adapted to our soil and situation in eastern Crawford than the cultivation of cereals or fruits. The horses of Crawford have been exported to the imperial stables of Europe. Our butter and cheese take the first premium and command the highest price at home and abroad. The cheese factories of this county, which numbered only eight in 1870, now exceed eighty. The revenue derived from the dairy products alone, in this county, amounts annually to millions of dollars, and yet it is not extravagant to say that this branch of farm industry is still in its infancy. If we but mark the footsteps of the Creator, we shall see that we stand here near the summit of the lake ridge, at the dividing of the waters running north to Lake Erie, as well as south to the tributaies of the Ohio.

The well springs that supply
  The streams are seldom spent,
For clouds of rain come by
  To pay them what they lent.

The clouds that cast their rain
  On lands that yield our food,
Have water from the main
  To make their losses good.

To follow these indications of Providence, and to make the most of our natural advantages, our local agricultural society was instituted a few years since. Our city joined heart and hand with the country in making it a success. We have sowed liberally. We have reaped bountifully, and we see every year new and fruitful fields re-claimed from forests, once standing in idle grandeur, and old farms renovated. We see improvement in stock—better tillage and more planting, larger crops, better fences and barns, better inns and roads, and more pride in internal improvements in the rural districts. More agricultural papers are taken—more inquiry is made for farm implements and improved machinery. Our kitchen and garden supplies are no longer imported, as formerly; but are produced upon farms in this immediate vicinity. Our annual fairs are both a school to the farmer and a general holiday of the people, and our city authorities have taken the preliminary steps for a public market place and day in our city, which we trust will some time rival those of Jamestown, New York, and Doylestown, Pennsylvania.

We would, therefore, invite the farmers of other sections of the country to settle in our midst. Especially would we call upon the experienced dairymen of the rich valleys of the upper Susquehanna, the cattle breeders and wool raisers of the thousand hills of Washington, and the skilled yeomanry on the banks of the Delaware and the undulating plains of Lancaster and Cumberland to cast their lots with us. To the citizen, too, who would exchange the pursuits of husbandry for the hazards, excessive taxation, and follies of city life, we would say, try a farm. For, indeed, there is food for reflection for the political economist and the citizen both, in the indisputable fact, that during the financial crisis, through which the country is passing, while merchant, manufacturer, banker, and even mechanic—all feel the pressure of hard times, and while many of them have been driven to the wall, and into bankruptcy, it is great satisfaction to look around and observe that the agricultural class have almost entirely escaped this wide spread calamity. Truly, the farmer of this country is, after all, in an economical as well as political sense, the sheet anchor of our national prosperity and stability, the balance wheel of our complicated national forces. But I have trespassed upon the patience of this audience too long.

This large concourse of spectators, these city councils, these producers and ex-soldiers and citizens, as well as farmers, with lighted faces and murmurous as the sea, have come to this hall to greet your Excellency on this occasion. It is not only the office you hold, nor the sword you bear, nor the scepter you are soon to lay down which attracts them, but there is something in your public record that challenges respect. They re-call many events in your administration that come home to their business and bosoms. Under you a new Constitution was born, extirpating the evils of special legislation, root and branch. In your time, the glories of the centennial era of the Republic were ushered in. They know how you have strengthened the military system of the State government, arming it with power to strike not only for liberty, but for public order and tranquillity. They re-call your counsel in behalf of industrial education in the common schools, which is prophetic of a brighter era under the new lights of science, and we all vividly remember that day of wrath when Pittsburgh was in the hands of a mob, and public and private property at the mercy of communists, how you came upon the scene like the guardian angel of the State; and how, like Cocles at the head of the bridge, you held at bay the hydra-headed monster, conquered a peace with your uplifted sword, which forbore to strike, and restored the order of society without a compromise or lowering of governmental authority. And only a few weeks since you appeared at Franklin as the vindicator of the majesty of the law, saying to the collosus of corporations: "Hitherto shalt thou come and no further, and here shall thy proud waves be stayed."

Welcome, then, Governor Hartranft! Welcome gentlemen of the State

Board of Agriculture! Thrice welcome to the metropolis of the oil region!

His Excellency Governor Hartranft, on behalf of the Board, replied as follows:

It is my pleasant duty to acknowledge, on behalf of the State Board of Agriculture, the cordial reception of the citizens of Titusville. We are grateful for the solicitude you have shown for our personal comfort, and encouraged by the manifest interest that has everywhere been taken in our work. This interest, so general and profound, is proof of the importance of the Board.

I hardly think it is an exaggeration to say that Pennsylvania is the richest forty thousand square miles in the world. The gold fields of California, the silver mines of Colorado and Nevada, and the diamond diggings of Australia, if more brilliant, must yield in intrinsic value to the coal, and iron, and oil of Pennsylvania. We have here all the elements of civilization.

The immense value of the coal, and iron, and oil, and timber industries of Pennsylvania have caused us, in a measure, to forget the fertility of its surface. The brilliant results of our mines and manufactures, as contrasted with the slow returns of agriculture, should not allure us from a symmetrical development of all our resources. Over the millions of tons of iron, and coal, and the flowing rivers of oil, and under the trees of the forests lies some of the richest farming lands in the country. In every part of the State the soil will amply repay the toil of man.

It is the importance of applying to agriculture the knowledge, the new discoveries and new inventions of science and experience that has led to the organization of this Board. Its design is to awaken deeper interest in and discover the importance and dignity of agricultural pursuits, and, by promoting intercourse among farmers and kindred classes, to gather the results of individual experience and all other information for general dissemination and use. In pursuance of this scheme, the Board has held meetings in various parts of the State, and has everywhere met with gratifying manifestations of approval and esteem.

While there is something instinctively pleasant in the primeval occupation of man, and a singular sense of security and independence connected with ownership of the soil, we yet assure you that our deliberations are conducted in no exclusive spirit. All industries and all classes are equally important, and if sometime the State is apparently slow in redressing even the great wrongs, it ought to be remembered that the complicated interests and far-reaching results require that the re-adjustment of great industries should be undertaken with care.

I thank you again for your attention, and earnestly invite your attendance and coöperation in our labors.

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The following essay, by Professor Hamilton, of Pennsylvania State College, was read, and discussion deferred until next session:

THE HIGHER INDUSTRIAL EDUCATION.

This is a nation of workers. Almost every industry, from the most simple and easily understood, to the most complex and difficult, is pursued among us. In the earlier stages of society, when wants were simple, the forms of labor necessary to supply these wants were correspondingly simple; but as the race progressed and tastes became more highly developed, the demand for the old simple forms was lessened, and new and higher and more complex forms were required.

This progress has continued until the necessity for ordinary labor has become comparatively slight, and the number of common workers, as instanced by the army of the idle, is greater than the demand, whilst the demand for skilled workers is constantly increasing, and the number responding is far below what is required. Every year seems to have added to the ranks of the unskillful, and consequently unemployed, until the subject of their relief has become a grave national question. Labor, too, has become alarmed at her situation, for she has discovered that if she would not be left to gain her livelihood in abandoned processes and unremunerative forms, she must do one of two things, either stop human progress, or else keep pace with civilization. Although the first proposition is advocated by some as the remedy for what they term the wrongs of labor, yet it is so opposed to the spirit of our institutions as to be unworthy of serious consideration. But the second question is one of very grave importance. What can be done to enable labor to keep abreast of civilization, and in time lead its advance? For many years labor has been asking this question. For many years the most able philanthropists and statesmen have given it their careful attention, and the more thoroughly it is investigated, and the longer it is considered, the more decided, emphatic, and unvarying is the reply that is returned: educate labor and along with labor the laborer.

The great need of the industrial classes in order to meet the demands of the times is knowledge, a knowledge of what to do and how to do it. They, in other words, need education, and such education as will best fit them for their pursuit in life.

This idea has, in an informal way, been handed over to the educators of this country, with the request that they provide a course in education that will meet this want.

For more than twenty years the question has been before the educational institutions of this and other States, and whilst progress in the direction of industrial education has been made, yet most have to confess that existing plans are immature and present methods are far from perfect.

For quite a while the leading educators and educational institutions of this country either totally ignored the project or treated it with contempt. But the demands of the people for some system of relief became so urgent that they were forced to drop their old educational prejudices and set themselves to meet these new demands. And now the course of educational thought seems to be in the direction of making education a more available means of advancing the interests of industrial art.

Those who are engaged in industrial pursuits may be divided into two classes: First, "Those who work under directions, or day laborers. Second, Those who direct and control, who invent new processes or improve the old. " The first embraces the trades and requires long practice in order to skillful performance." The second calls for, first of all, a thorough acquaintance with the principles underlying the art; and second, such practical acquaintance with it as will enable the individual to perceive its demands.

In order that the wants of these two classes may be met, there ought to be, it would seem, two kinds of industrial education provided, one for the trades, and one for the higher forms of industrial art. It is practically impossible for the mass of workers ever to pursue any very extended course of education, or in other words, become college graduates. Most are too poor for to spare either the time or the money for such a purpose. Many are disinclined to study. And multitudes see no necessity for such extensive knowledge in order to gain a livelihood. Comparatively few, therefore, of the whole number of workers will obtain diplomas from the colleges of the land. Most must be content with the education given in the common schools, whilst many are destitute of even that. The art education of these multitudes, who are thus deprived of collegiate advantages, is a subject all important and requiring immediate attention on the part of legislators and educators; and upon its proper solution will depend in a large degree the progress of industry and the welfare of the country. The character of the subject assigned me, and the limits of this paper, forbid my discussing this division of industrial education. And I shall do no more than express the conviction that it is not only possible, but entirely practicable for a considerable degree of art education to be given these masses, and that, too, without serious additional expense to the State.

The subject that I am called upon to consider is, "*The Higher Industrial Education*," or such education as will fit men for higher industrial life.

For years many of the most thoughtful and intelligent men of the land, in looking into the educational system of their time, felt that something important was lacking in the course of training pursued by classical schools. Whilst these schools sent out men of large learning and great mental ability, for the learned men of that day, and modern times have produced none greater, were almost, without exception, trained in these schools, and, although they received young men from every situation in society, from all occupations, professions, and trades, yet they returned but a small percentage to industrial pursuits; but gave, on the contrary, their classes nearly unbroken to professional or literary life, thus causing the brains of industry to be appropriated by professional pursuits. The results of this course of training had become so certain that the fact that a boy from industrial life was in college, and intended to graduate, was positive evidence that that boy was lost to industrial art.

There was something in their course of education and training that gave a boy a distaste for industrial pursuits, and as certainly gave him a longing for professional or literary life.

This could have but one effect upon the industries of the country, and that was to seriously retard their progress, and eventually cause their death. In view of the serious consequences sure to come when this productive strength of the country is taken and turned into unproductive pursuits, leaving only the ignorant to do manual work, it became exceedingly important to the prosperity of the country to discover some means for arresting this flow. So alarming did this injury to industrial pursuits become, that the national Legislature was called upon to provide a remedy.

Congress, after very full discussion of the problem, and after consultation with men of all classes, learned and unlearned, ideal and practical, both in this country and in foreign lands, passed the act of July 2, 1862, entitled, "An act donating land to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts." It, of course, became important to know just what kind of a school Congress intended to establish. The act declares that "the leading object should be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislature of the State may prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Congress thus intended to establish schools that would "promote the liberal and practical education of the industrial classes in the several pursuits and professions in life," mentioning specially agriculture, the mechanic arts, and military tactics. Or, in other words, a school which shall better fit men for industrial pursuits, in order that thereby they may benefit industrial arts. Congress clearly did not intend to establish the old classical schools, or schools to turn out men for the so-called learned professions or literary life. These already existed, and it was to cut loose from these and the course of training so destructive to industrial art that it gave the lands. Congress wished to establish a school, not for the literary classes, but for the industrial classes. It would therefore seem, under this act, to be a perversion of the funds granted to use them for the purpose of giving a purely classical education, since this appears to be the very thing Congresss ought to avoid. A purely classical educational course, therefore, in such a college ought not to be maintained, or if maintained at all, not out of this fund.

The act declares not only that schools shall be established for the benefit of the industrial classes, but it also says that the education given must be "liberal and practical." It lays no more stress upon one than upon the other. It does not say that it shall be two thirds liberal and one third practical, or the reverse, or that one man shall be educated liberally and another practically, but it is to be liberal, and at the same practical. There seems to be no limit to the extent of this education further than that fixed by circumstances and the demands of the times, but it must, nevertheless, be kept in mind, that however short or extended the course may be, the liberal and practical education must go hand in hand, and no sacrifice of one for the benefit of the other is allowed. Neither is it first liberal and then practical, but liberal and practical side by side.

"The primary object of education is the discipline and improvement of the mind." A man's power for usefulness, other things being equal, "depends upon his mental power, and his value to the world depends upon this and his ability to use that power for the good of his race." An idiot or an imbecile is of little use as a member of society, or as a citizen of the State; but a Webster or a Clay makes his influence felt throughout the world. It has been well said that "it is to the mind of man chiefly that must look for the guage of his power," and the effort therefore of a college should be to develop this power in the highest degree." If he is to be useful he must have this mental force. It is the main power of the man; deprive him of this, and he is not only utterly useless, but a burden to society. But if the mental development is all that is needed, why not, you ask, turn the pupil over to the classical schools, which profess and confessedly do give this training? Just here is the difficulty with the literary colleges. The course of study by the old system devoted the entire time of the student to literary work. To languages, literature, philosophy, pure mathematics, &c., and the whole atmosphere of the college, the conversation, dress, and habits were such as to draw away the tastes from industrial pursuits to professional life. Their failure as industrial educators was not in the too great development of the minds of their pupils, but in influencing these minds to forsake industrial life. Here is the key to the whole question of higher industrial education. The old methods of instruction were defective in that they gave the students' mind a bias towards literature and the professions instead of toward useful industrial arts. The industrial education must remedy this not by giving inferior training, but by biassing the mind towards industrial art. The object of an industrial college should therefore be to first of all educate mens' minds, educate them highly, not give them less power than do the literary schools but a greater, and then turn these minds thus trained and educated, into not literary, but industrial pursuits. This accomplished, the problem of industrial education is solved.

But what is meant by "industrial pursuits?" Does it mean that men shall be educated highly, until they possess great mental power, and then devote the rest of their lives to breaking stones upon a turnpike, or to digging ditches, at fifty cents per day? Does it mean that such a one shall, if his tastes are mechanical instead of agricultural, simply clean grease from old castings, or sledge up old iron during his entire life? It does not. The man is capable of doing better work than this and it would be a prostitution of his powers for him to devote his life to any such employment. The demand in industrial life is not so much for "day laborers as for improved processes." "There are day laborers enough, but what is wanted is better and more economical methods." Manual skill in the art is not so much needed as knowledge of the principles that control the art. Not so much a man to follow a plow, as a man that will invent a plow that will do twice the work with half the cost of the present one. It would be great folly for a man of high attainments to devote his life to labor that would bring him but fifty cents per day, when he could as easily earn twenty-five dollars in the same time, by pursuing a different course. "Common labor is, and always will be, cheap," and it is useless to expect that men will go to college, spending from one to two thousand dollars, besides years of labor, in the acquirement of an education, in order that they may devote their lives to digging ditches. A college education is not necessary in order that a man may be a good ditcher. The man can earn no more at this business, with his education, than without it; possibly not as much as the uneducated man by his side. Muscle is needed here, and muscle is paid. An educated man cannot hold plow enough better than the uneducated man to justify the employer in giving him seven or eight times the wages of the other, and so in mechanical trades. Here is the rock upon which so many plans for higher industrial education have split. They expected men to spend thousands of dollars in the acquirement of a thorough education, and then go to work at common labor for fifty cents per day. Their pupils did not do it, and they never will do it. Their duty to themselves, to their families, and to society, demand that they do better, if they can. It may be accepted as a principle in life that men work for money, and not for pleasure alone, and that an "industry must be remunerative, or it will lack competent men."

"The graduates of these colleges must get lucrative employment in industrial art, or they will leave it."

The place for the man possessed of higher industrial education is not that of a hewer of wood or a drawer of water, but in the higher departments of industrial life. There is where the demand is made.

A cry comes up to these schools for competent directors, inventors, improvers, investigators, superintendents, engineers, discoverers, managers, designers, and the like. Comes up from all the departments of industrial art, and these will furnish ample and remunerative employment for men of education, through all time to come.

It is evident, too, that these schools are not schools whose object it is to teach trades, "for it is impossible in the limited time of a college course to do justice to the mental culture of the student, and at the same time give a high degree of manual dexterity in any trade." So much and such sort of practice can and should be given, as is needed to illustrate and enforce instruction in the principles of the art, and no more.

Trade schools on the other hand, and for similar reasons, can do little else than teach the trade.

The true object of these higher industrial schools is to send out classes of highly educated men and women, who, instead of turning their attention to the professions or literature, will direct their powers towards the improvement of industrial art, and benefit the body of workers through the discovery of principles, and the improvement of processes in all the departments of industrial life.

The object is to educate men who, with, their superior mental power and knowledge of science and art, will devote their lives to inventing, managing, organizing, directing, and discovery. Men of high scientific attainments who shall reveal to the mass of mankind the practical uses of science. Men like Franklin, Johnston, Watt Leibig, and others taking one or several branches of industrial art, and improve it and make it available to the mass of their fellow-men, discovering new and improved methods that the most ignorant can apply in their daily work.

Here is the work of the higher industrial schools, and the field is limitless. Agriculture, mechanics, science, architecture, fine arts, manufactures of every conceivable kind, and in every land call for talent and ability to devote their powers to their use, and they pay for it—pay far better than the learned professions, as law, medicine, or literature.

Here is a field unoccupied by the educational institutions of the day. The literary colleges do not fill it, but, on the contrary, drain it of it present life. Let the literary colleges still supply the ranks of literature and the professions;

Let the industrial schools see that equal power is yearly added to the ranks of industrial life.

The important question yet remains, can a system of education be constructed that will certainly and surely graduate men of high attainments into industrial life?

I believe that it can. I believe that it is possible and practicable by a proper system of training, to turn men into any pursuit in life. History shows that this has been done, and observation of existing institutions shows that it is done to-day. The principle is no new one, neither is it uncertain in its action. It is old as history, and as certain as any other law. The universal practice of individuals in the government of their families, of all bodies, civil and religious, in dealing with mankind, prove conclusively that training, habit, and association are the "forces that mould the race." The children of Catholics are commonly Catholics, those of Presbyterians, Presbyterians; the children of Democrats, Democrats, those of Republicans, Republicans; and the same law and principle holds true throughout the whole structure of society. The reason why the children of lawyers are not always lawyers, and those of other professions and trades the same as that of their fathers, is because no judicious course of special training for this purpose was brought to bear upon the child in its early life. When children are devoted to the ministry by their parents at an early age, they commonly adopt this life, and the same is true of the law and other professions. Children wander off into other trades and professions, because they are left largely to themselves, or see but the disagreeable side of their father's work.

The Jesuits train ninety-nine in one hundred of the boys that they get to be Jesuits; and they do it by system, there is no chance about it. West Point turns out her soldiers year after year, and she manufactures them from the raw material. Princeton, Yale, and Harvard each turn out men of different stamp. Oxford, Cambridge, and the various German universities, each sends out its distinctive class of thinkers.

The influences they bring to bear mould the minds of those whose education they control. What system of education then will cause students to choose industrial rather than literary life? This is the educational problem that has occupied the attention of the friends of industrial education for many years. I have stated that the old methods of instruction were defective as industrial educators, in that they gave the minds of their students a bias towards literature and the professions instead of toward the useful arts. Their course of study, their methods of instruction, the tastes of their teachers, and all the influences of the educational establishment were calculated to magnify literature and the learned professions, and breed a contempt for practical life in the mind of the student.

The teachers were commonly men whose education was of the literary kind, knowing but little of the wants of practical life, or the necessities of useful art; on the other hand, they rather prided themselves upon their abstractions, and despised the knowledge that attempted to reduce these to such forms as might enable them to be used by the world beneath them. Is it strange that from such teaching and such associations young men, in their ignorance of the real want and opportunities of practical life, should turn to learning and abstraction instead of to useful arts? Is it not rather strange that ever one returned to practical pursuits; when, as, in rare instances, it did occur, that some one appreciating the demand of the vast field of industry upon educated men, resolved to enter it and contribute his share for the benefit of his race, his purpose was met by the pitying smile of teachers, and perhaps the open sneer of his cultivated classmates. For years the scientific students in Yale and Harvard were despised by the literary classes, and to-day the literary colleges, though not so much as formerly, look with contempt on the scientific schools, and even in these scientific schools themselves the practice of useful industry in connection with collegiate training is sneered at as unbecoming and unfit employment for gentlemen of brains.

I will not be understood as undervaluing literary studies. On the contrary, I believe that no education can be complete without somewhat of this literary culture. But what I do protest against just here, is the intellectual snobbery that assumes that useful art is necessarily degrading. The means that I have to propose for turning the tide of higher education into industrial channels, is to have the circumstances in these schools in accord with the object to be attained. Give a discipline and education of such a kind and in such a way, and under such circumstances, as will bias the mind of students in the direction of industrial art. How can this be done? I reply that it cannot be done, if the men who lead in industrial education do not believe in it. To put a Democratic President, with a democratic cabinet into power, to carry out Republican principles, would be thought absurd. To put a Quaker, no matter how able or how good a man he might be, at the head of our armies, would not be considered good policy, especially if the government was engaged in an extensive war. To make a Presbyterian Pope of Rome, would not be the best way to propogate the doctrine of papal infallibility throughout the world. The principle that is involved is, that those who give direction must be in sympathy with the main idea of the project. So it is in industrial colleges, there must be first of all, and before anything else is done, a corps of instructors informed as to the wants of industrial life, and in full sympathy with industrial education. The lack of this, more than the defect in the system of education pursued, has caused the failure of so many of our industrial schools.

I reply, second, that the system of education and course of study must be different from that of the old classical schools.

I do not mean that the industrial course should cut itself loose entirely from the old education of the classical schools. These schools did good work in developing the mind, and so far as they trained the intellect and developed mental power were all right, and the studies that tend to this development should still be kept and required, not, perhaps, to the extent that they reqnired, but to some extent, and to an extént sufficient to make correct thinkers and strong reasoners.

But the old education neglected to recognize the fact that life deals not only with mind and metaphysics, but with matter as well, and, consequently, those subjects of study that give information in material things were omitted, or, in other words, the natural sciences were not taught as studies bearing directly upon the practical side of life. Nature was left to take care of herself, and man's relation to natural things was not shown, Their graduates were expected to understand logic, rhetoric, mathematics, and language; but botany, geology, chemistry, and the other sciences that affect practical life were not required, or, if required, were superficially taught. The industrial education should make much of these natural sciences, partly because they are matters necessary in any well rounded education, but chiefly because of their bearing directly upon the practical side of life, and because of their tendency to give that bias to the minds of students that it is the object of an industrial education to give.

These sciences should not be taught in their abstract form alone, but in a practical way, keeping constantly before the mind of the pupil the economic value of the sciences that he studies, and the relations that exist between these sciences and practical life, and at the same time their influence upon the comfort and happiness of mankind should be fully and clearly set forth.

The higher industrial education means not an inferior education, but one more extended than that of the old, for it is evident that the man who intends to make the domain of nature and art his life study, should, in order to interrogate intelligently, and interpret the replies correctly, have an education superior to one who wishes merely to gain a livelihood in law or medicine, or professional life. He must first of all take rank as an educated, competent man. He must meet the classical scholar upon his favorite ground, and must stand side by side with the eminent scientists of the day. He must, in other words, combine the acquirements of both.

But it is not enough in an industrial education that a man have merely a knowledge of the theory of things. A man may know the theory of music and not be able to strike correctly a single note. A man may understand the theory of swimming, and yet, when plunged into the water, go to the bottom like a stone. Knowing, without ability to do, is of little value. Power of any kind, without ability to use it, is about worthless; and ability to use comes only through practice. It is well established that it takes "practice to make perfect." There must be practice in all education. Chemistry, botany, mathematics, literature, language, and art each requires practice to fix the student's knowledge, to familiarize him with the details of processes, and to give him confidence in his ability to do.

Whilst this is important in any education, it is specially important in industrial education in giving that bias that it is the special aim of these colleges to give. The practice should be adapted to the course of study, and it, like the rest of the educational course, should be a complete and progressive course, and not the repetition of previous practice, but new work at each successive stage of progress. No student should be exempt. If he is physically unable to practice, he will be unable to pursue an industrial calling, and should therefore go to some school where the object is not specially to produce scholars for industrial life. The amount of this practice should be simply enough to fix the student's knowledge, and no more. He is not here to learn a trade either in science or art, he is here for his education, and if he wishes to pursue a special course in any department of study or practice, he can do so in a post-graduate course. For it is evident that if he does so whilst in his regular course, he must do it at the expense of some other branch of learning, and no one department has a right to rob another of reasonable facilities for culture. As constituting a most important part of the industrial practice, I mention drawing in its various departments. It is the alphabet of art, and it gives a familiarity with the forms of things, and keeps the student to the practical side of life as nothing else that I know of does. It is all important in a course of practice in an industrial college.

This, then, is, in general terms, the way that I propose for causing students to enter industrial life. Add to the old education: First, teachers familiar with the wants of and in sympathy with industrial art. Secondly, a full and thorough scientific course, with, at least, one modern language. Thirdly, a progressive, well arranged and equipped, system of practice. I do not mean by this three separate and distinct courses of study, a classical, scientific, and practical. I would have but one course combining all these, and required of all students who enter. Not a classical school, not a scientific school, not a trade school, but a combination of all these—an industrial school.

In the course of studies that I am about to submit, it has been the aim, not only to meet the views advanced in this paper, but also to construct a course arranged so that any section of it will be complete, that whether the student wishes to stop early or late in his course, he shall have had symmetrical development, and a complete education so far as he has gone, and no matter what his pursuits in after life may be, to fit him in the best possible way for engaging in it with the highest credit and profit to himself, and, at the same time, enable him to elevate his calling among the industries of the world. It will be noticed that the course submitted provides no optional studies.

If the college is to bring about definite results the means must be used and insisted upon that will bring about those results, and whilst only those studies, and so much only of them as is necessary to the end in view, should be permitted in the course, yet these should be required. These studies have been prescribed because they are deemed necessary, and not merely to fill up the curriculum. Students who are up in the course may take extra studies, but not as substitutes for those prescribed. In cases where students have not the time to complete the entire course, and wish to enter upon their specialty, they may be permitted to stop in their college course after the sophomore year, and pursue a special study, giving the entire time to this study until it has been completed. The object of the college being, however, to induce students to take the full course, and then pursue one of the post graduate courses to fit them for their special work.

The college course contemplates topical study and recitation, and in order that this may be most efficient and practical, each professor should make out a complete schedule of hours of recitations in a given study in his department. The days upon which his recitations shall come; the number of pages for each day, and in addition should make out a list of reference for each topic, showing where the latest and most reliable information can be obtained in regard to that topic. Said list to be printed in the text book, so as to be easy of access by the student. The library of the college should become a reference library, and those books referred to by the professors should be purchased and placed on the shelves for use by the student.

The course of study submitted contemplates recitation upon five days of the week, leaving Saturday for recreation and society work. The schedule for each day gives eight hours for sleep, eight hours for study and recitation, and eight hours for meals, recreation, drill, and practicum, and is arranged as follows:

		Hours.		
Sleep,	10 — 6	8		
Breakfast,	6 — 7	. . .	1	
Study,	7 — 9	. . .	. . . .	2
Recitation,	9 —12	. . .	. . . .	3
Dinner,	12 — 1.30	. . .	1.30	
Practicum,	1.30— 3.30	. . .	2	
Dress for drill,	3.30— 4	. .	.30	
Drill,	4 — 5	. . .	1	
Supper,	5 — 7	. .	2	
Study,	7 —10	. . .	. . . .	3
		8	8	8

Academic Course—Three Years.

Hours per week.	First Year.	Hours per week.	Second Year—*Continued.*
4	Elementery Algebra.	1	Tactics.
1	Descriptive Astronomy.	4	Drill for Boys.
3	Latin.	4	Calisthenics for Girls.
1	Physical Geography.		{ 5. Horticulture and
1	History and Constitution of U. S.		Gardening.
1	Botany.	10	Practicum, { 4. Drawing.
1	Moral Philosophy.		{ 1. Music.
1	English Literature.	1	Rhetoricals.
1	Agriculture.		
1	Tactics.		Third Year.
4	Drill for Boys.		
4	Calisthenics for Girls.	2	Geometry.
	{ 5 Agriculture.	1	Plane Trigonometry.
10	Practicum, { 4 Drawing.	2	Latin.
	{ 1 Music.	2	Greek.
1	Rhetoricals.	2	French or German.
		1	Agriculture.
	Second Year.	2	Chemistry.
		1	General History.
3	Higher Algebra.	1	Mental Philosophy.
1	Geometry.	1	English Literature—Shakspeare.
2	Latin.	4	Drill for Boys.
3	Greek.	4	Calisthenics for Girls.
1	General History,		{ 5. Mechanics.
1	Agriculture.	10	Practicum, { 4. Drawing.
1	Natural Philosophy.		{ 1. Music.
1	English Literature.	1	Rhetoricals.
1	Physiology.		

College Course—Four Years.

Hours per week.	FIRST YEAR.	Hours per week.	SECOND YEAR.
1	Surveying.	1	Spherical Trigonometry.
2	Analytical Geometry,	2	Calculus.
2	Chemistry.	2	Zoölogy.
1	Botany.	2	Latin.
1	Anatomy and Physiology.	2	Greek.
2	Latin.	2	French or German.
2	Greek.	1	History of Literature.
2	French or German.	1	Civil and Common Law.
1	General History.	1	Rhetoric.
1	Agriculture and Mechanic Art.	1	Agriculture and Mechanic Art.
4	Drill and Military Science, (boys.)	4	Drill and Military Science, (boys.)
4	Calisthenics and Domestic Science, (girls.)	4	Calisthenics and Domestic Sciences, (girls.)
1	Rhetoricals.	1	Rhetoricals.
10	Practicum, 1. Surveying. 2. Botany. 2. Drawing. 1. Music. 2. Agriculture.	10	Practicum, 4. Chemistry. 1. Zoölogy. 2. Drawing. 1. Music. 2. Mechanics.

Hours per week.	THIRD YEAR.	Hours per week.	FOURTH YEAR.
2	Civil Engineering.	1	Astronomy.
2	Mechanics and Mechanical Engineering.	1	Ethnology.
2	Geology.	2	Physics.
2	Physics.	2	Constitutional History and International Law.
2	Greek.	1	Philosophy of Science.
1	Evidences of Christianity and Elements of Philosophy.	1	Comparative Philology.
1	History of Arts and Manufactures.	2	History of Philosophy.
1	Logic.	2	Natural Theology and Philosophy of Religion.
1	Political Economy.	3	The Great Masters in Art compared.
1	Agriculture and Mechanic Art.	4	Drill and Military Science, (boys.)
4	Drill and Military Science, (boys.)	4	Calisthenics and Domestic Science, (girls.)
4	Calisthenics and Domestic Science, (girls.)	1	Rhetoricals.
1	Rhetorical.	10	Practicum, 6. Drawing. 1. Music. 4. Mechanical Physics.
10	Practicum, 4. Drawing. 1. Geology. 1. Music. 4. Mechanics.		

Post Graduate Course.

School of general and applied chemistry.
School of civil and topographical engineering.
School of mining and metallurgy.
School of agriculture, horticulture, and landscape gardening.
School of design.
School of commerce and trade.
School of fine arts.

School of building and architecture.
School of mechanics and mechanical engineering.

Adjourned to meet Wednesday, September 11, at eight, A. M.

At an adjourned meeting of the Board, held Wednesday, September 11, 1878, Board called to order by his Excellency, the Governor, at eight, A. M.

The discussion on the essay of Professor Hamilton, on the higher industrial education, being open,

The **PRESIDENT** (Governor Hartranft) said: I think this is a very important subject, and, to a certain extent, it is an interesting one to our Board. I have been agitating the question of industrial education as much as possible, because our old apprentice system is gradually dying away. In fact, in many branches of trade, by reason of improved machinery, whereby so many manufactures are made so much cheaper than by hand, we must, it seems to me, educate the most of our children in some way by which they will be better qualified to enter our machine shops and other places of industry, because in ordinary machine shops and manufactories they will be put to a certain line of work, and will be kept at a particular machine, and will not acquire the general knowledge, unless they are there under instructions, which is not generally the case with the mass of children, and it seems to me that the whole question ought to be, by our educators, thoroughly examined into, and, if possible, the system changed in the common schools, so as to make the education of our children more practical.

While I was very much pleased with the remarks of Mr. Taylor, as to a higher education, yet that applies to comparatively few children. Comparatively few of our young people are able to take advantage of our collegiate institutions, in this country. What we have to look to, mainly, are the masses of our children; and I have always felt that the common schools are drifting too much towards higher education. They teach the young the languages to an extent that is hardly necessary; and in our larger cities they give them an education almost equal to that given by some of our colleges. They educate these young men for positions and professions, which many of them are not able to fill, and their lives are of as little account as though they had received no education at all. In fact, they are uneducated. It would have been a great deal better had they not had these higher advantages, but gone to work at something more in conformity with their natural qualifications. Then they would have made more for themselves, and more for the community at large. I do not propose to know much about this, because I am not a practical teacher; I have simply tried to call the attention of the public to what is needed, in order to agitate the question.

I think this is one of the most important questions before our people, at this time; but we ought not, as we are apt, to drive too much in one direction. Since industrial education has been discussed, it may be that we are trying to do too much in that way; but certainly the agitation of it must do some good.

Since it is well established that the apprentice system is so much ignored that the child has not the advantages now to become a mechanic that it had twenty-five years ago, we ought to foster, in some way, a common school system that will be more practical, and give the young some course by which they will become more useful to themselves and the public generally.

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The next essay having been called for, the following was offered:

THE ADAPTATION OF THE PINE LANDS OF PENNSYLVANIA TO AGRICULTURAL PURPOSES—HOW THEY MAY BE OPENED UP TO SETTLEMENT, AND HOW MADE TO ADD TO THE GENERAL WEALTH OF THE COMMONWEALTH.

By Hon. A. J. Quigley, *of Clinton.*

I will proceed to divide my subject into three departments, and treat them in detail.

1. Their Adaptation to Agricultural Purposes.

In attempting a proper discussion of this subject, it will be proper to lay before you an approximate estimate of the quantity of acres susceptable of agricultural tillage. Most of these lands lie on the top and eastern and western slope of the Allegheny range, a district of country embracing some thirty counties, or nearly one half of the whole State of Pennsylvania, or about twenty thousand square miles, covering an area of eleven millions four hundred and forty-five thousand eight hundred acres. The larger portion of this territory was once covered with immense forests of pine timber, most of which is now cut off, leaving the land comparatively worthless, except for agricultural purposes. Of this large body of lands the greater portion is capable of a high state of cultivation, and may be made to team with the rich productions of the earth. True, a considerable portion is mountainous, and cut up with small streams and deep ravines that cannot be cultivated, but this portion is inconsiderable as compared with the entire body. In most of these counties there is now considerable population in detached settlements, where the timber is sparse, or where it was cut off at an early day, but in many places from twenty-five to thirty miles intervene without a single settler.

More than one half of this entire body of lands, now an uncultivated wilderness, is capable of maintaining a population much larger than at present exists in those parts now under cultivation, besides it can be made to yield abundant fruits to the labor of the industrious husbandman. The fertility of the soil is beyond question, and well adapted to the growth of every variety of production common to our temperate climate. While these lands were covered with pine timber, the owners held them against settlement on account of the fires originating from clearing, which would have destroyed the then growing timber.

The character of the soil is admirably adapted to the growth of every kind of cereal. Wheat, rye, oats, barley, and some varieties of Indian corn, are raised in great abundance. The soil is better adapted to the growth of potatoes than the alluvial deposits of the Susquehanna valley. Timothy and clover seem indigenous to this soil, two of the essential prerequisites to the propagation of cattle and sheep.

Last year, on lands lately cleared and put under fence, which came under my own observation, the yield of wheat was thirty-eight bushels to the acre. Of potatoes, Mr. Warren Summerson, of Chapman township, Clinton county, informs me that he raised on three and one half acres over twelve hundred bushels or three hundred and forty-three bushels to the acre upon land that it must be remembered had all the original pine stumps still standing upon the ground. Mr. Robert Bridgens and Mr. Martin Mayres, of the same township, on adjacent lands of the same character, informed me that the oats they raised last year yielded fifty bushels to the acre, and weighed forty-six pounds to the bushel. This year the weight is thirty-nine pounds. From one quarter of a bushel of Golden medal wheat, they had five and one half bushels, weighing sixty-five pounds to the bushel. Mr. Brotherson, of Germania, Potter county, also informed me that his oats last year weighed forty-eight pounds to the bushel. The lands in Potter have a higher elevation above sea level than any other county embraced in this district. The quality of wheat grown on these lands is much superior and yields a larger percentage of flour than on lower lands. Some varities of corn may be successfully produced and yield a pretty fair crop, but the late and early frosts of the spring and fall, render the successfull productions of Gourd seed and large yellow precarious. These lands, for the most part, are generally level, with here and there slight undulations varying in surface no more than Dauphin and Lancaster counties. Butter and cheese can be made here in great abundance.

For twenty years Bradford county has been noted for her superiority in this production, of which she has had a large export trade with New York and other eastern cities. The character of the soil in Bradford is the same as in all the others of the thirty counties embraced in this district. The pine timber having been cut off in Bradford at an earlier day, settlement was invited from the border counties of New York, of an industrious, enterprising, and go-ahead Yankee population. Now, where once stood the towering pine and hemlock, may be seen the cheerful home of an industrious and well-to-do population. Elegant houses and barns greet the eye on every hand. Where fifty years ago was a howling wilderness, without song of bird or voice of human being, except the woodman's ax, may be seen the whirl of busy active human life. And what may now be said of Bradford and part of Tioga counties, may, in the no distant future. be said of this vast area of territory of which we speak. The general fertility of the soil, naturally, may not compare with the rich prairie lands of the west, but the advantages of market more than make up for all the difference. Most of these lands are underlaid with veins of rich bituminous coal. There is everything here to invite settlement. The healthfulness of the climate and purity of the air are proverbial. No malarial diseases were ever known to prevail. While the western farmer must give from three to four bushels of corn and two bushels of wheat to get one to market, the farmer here has his market at his door. Railroads are easy of access, or soon reach out their arms to gather up the rich productions needed at the multifarious, manufacturing, and mining operation that spring up on every hand. The bread and feed production has always been inadequate to the demand for consumption. Large quantities of grain, feed, and provision being yearly shipped from the west to supply the market of our State. The opening up of these lands will create a home supply and save the cost of transportation.

Having spoken of the adaptation of these lands to agricultural purposes, we will now speak of how they may be brought into market, and add to the general wealth of the State.

The flow of emigration westward has diverted public attention from the unsettled lands at home to the flattering prospects held out by railroad and land companies, who have received large grants of land from the Government, through which railroads have been constructed, and, in order to make them renumerative, settlement has been invited to raise produce for eastern markets. To go West without money *now* is worse than madness, and thousands, who have gone in that condition, have returned at the first opportunity. But here, a poor man without money may buy fifty or one hundred acres of land on time, and clear up sufficient to support a wife and family by working out half his time for others or on the adjacent mills or railroad, and by gathering a day's work here and there, to secure the necessaries of life; or, with one or two milch cows, he can make enough butter for market to buy his groceries, and, by strict economy, in a few years, be able to make payments upon his land.

Some legislation is necessary, and while struggling to assist himself, the State can give a helping hand. These lands, after the timber is off, are assessed at from twenty-five to fifty cents per acre. Just so soon as they are put under a state of cultivation, they are raised to from five to twenty-five dollars per acre. Here is where the State should step in and assist him. The law-making power should enact that every actual settler making a *bona fide* purchase of pine timber lands, should have relief from taxation of every kind, except for road purposes, for five years after he has taken possession and erected for himself a house.

It is easy to see that neither the State or county would loose anything by such enactment. Business of every kind would spring up where a barren wilderness now prevails. Revenues would, in time, flow into the treasury of the State, while the counties would be largely benefited, by adding to the general wealth, and distributing the burdens of local government affairs among a larger proportion of population.

But the question of how they shall be brought into market—how the poor emigrant and settler may be attracted hither, is the most important to be settled. Cannot the powers of the State Board of Agriculture be enlarged, so that the owners of these lands may furnish maps and official drafts to your department, and your Board be authorized to bring these lands to the notice of the emigrant and the poor native born laborer, who crowd our cities seeking a place to work or a home for his family. In these days of business paralysis, of general bankruptcy, when men are begging bread from door to door—stalwart men are hunting work, and cannot find it, cannot some means be devised to develop the latent resources of the great State of Pennsylvania, so that the *now* destitute may have homes where God, in his bountiful providence, may cause the early and the latter rain to make the earth teem with the benefactions of his hand.

Your Board has a noble mission before it—a glorious work to perform.

Let the great State step in and help you. Let the law-making power of Commonwealth provide the means at your disposal, and the needy will rejoice, and the barren wilderness will blossom with the rose.

Let the State establish an agency, under the auspices of the State Board of Agriculture, with power by and with the consent of the owners of these lands to bring them to notice of those desiring to make settlement, to furnish plans and drafts and directions, with conditions of purchase from the owners, and the next decade will witness the developed resources of the State, and thousands of now homelss families will rejoice in the blessings of assured future homes for honest and industrious citizens, who will be encouraged by your assistance and bless the day that the opportunity was afforded. Through much of these lands railroads have already been constructed, and others are in contemplation; but the opening of them to settlement will be the means of inducing the construction of other branch roads, made necessary by the development of the agricultural resources of this country. Here is the grand safety valve for the over-crowded population of the mining and manufacturing districts. Multitudes could be invited hither and be rejoiced at the opportunity afforded, if some means were devised to bring the matter under their observation.

Various plans might be adopted, but the most feasible to my mind would be through the State Board of Agriculture. The diversion of emigration westward should be discouraged just so long as our own State affords ample accommodations for her increasing population. There is no advantage either to the general government or the people in extending our western settlement any faster than the over-crowded population creates the imperative necessity. Visionary schemes of land speculators and railroad corporations receiving subsidy from the Government, beget chimerical elysian fields upon utopian projects, the ideal of which in most cases is never realized. To bring our resources as near as possible within reach of our wants, should be the settled policy of our people. To bring our supplies over railroads thousands of miles in length at ruinous rates in order to pay the cost of transportation, and allow our own roads to starve out or discriminate unfavorably against home industry and enterprise, is a stroke of policy, neither begotten in wisdom nor calculated to end in profitable results. While we may have a philanthropy that takes in the whole universe, we should remember that charity begins at home. The population in the mining and manufacturing districts, in the last decade, has increased beyond the demand for labor; while in the rural and farming districts it has not kept pace. To properly distribute this *excess* should be the object of wise wholesome legislation. But shall we, with the dead journalist, say: "young man, go west," without means, necessitating the projection of new railroads, without the hope of remunerative return, except upon government support, and allow millions of acres of fertile virgin soil, in our own midst, to lie idle and uncultivated within reach of railroads already constructed, and suffering for the want of home industries and undeveloped resources at our very doors.

We have been reaching out too much. We have had too many irons in the fire. We are leaving some of them burn. We are not utilizing those within our reach. Finally, how shall this add to the general wealth of the Commonwealth? The taxes upon these lands at the rate of five dollars per acre would increase the revenue to be derived from $320,000, at the present rate of assessment, to $3,200,000, an increase of nine hundred per cent. True, this increase under existing laws would only redound to the benefit of the counties. But whatsoever results directly to the counties must in time indirectly benefit the State at large, and be the means of largely adding to the revenues that by existing laws flow into the State treasury. The revenues of the State are derived from the aggregation of wealth accumulated from special license and corporate privileges granted by special favor by the State. Therefore, every aggregation of wealth, by whatever cause, must, to a large extent, enhance these sources of revenue while at the same time they distribute the burdens of taxation by multiplying the number by which they shall be borne. Three persons will bear a burden more easily than two, and upon this well-established principle the burdens of State and county may be comparatively lessened.

In conclusion, I might present to your board many investigations, the result of which might appear in this paper, had I the sources of information at my command. Among these is the adaptation of these lands to fruit-growing.

An immense collection of facts and estimates might be collected, condensed, and tabulated, throwing a flood of light upon this all-important subject. I am only able to present a comparatively fair idea of the relative area in a few principal counties, but it is exceedingly difficult to obtain accurate information of minor details; suffice it is to say that if our people could but have a bird's-eye view of human life in Europe, as represented by some of the writers on agriculture who have studied the habits and customs of the continent, they would realize the vast importance of the subject of this discourse, and the ample field opened to the frugal and industrious husbandman, of a rich and bountiful return for the labor of his hands, and a condition of independence and self-sustentation that the oppressed millions of the old world have never dreamed of.

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The next essay was called for by the President, as follows:

THE APPLE TREE BORER, ITS HABITS, RAVAGES, DESTRUCTION, AND PREVENTION.

By J. S. KELLER, *Member from Schuylkill.*

Among all the insects that infest the fruit grower's orchard, there is probably none that baffles their efforts so much as the apple tree borer.

This very destructive insect, by its clandestine movements, commits its devastations in a manner so unnoticed and unexpected by all except those who are perfectly familiar with its stealthy habits, that before they are aware of its destructive work, many fruit trees are irrecoverably ruined.

The perfect insect is a perfect beauty, so much so, that unless found by those to whom its habits are well known, its beauty would be likely to save its life.

This borer has become notorious for the ravages it has committed among our apple, pear, and quince trees; and requires our utmost vigilance to impede its ruinous progress. If this insect is allowed to commit its devastations unmolested, it will be only a question of time when the last apple, pear, or quince tree will exist in this part of the State.

The apple tree borer is the larvae of a beetle called *Saperda bivittata.* The upper side of its body is marked with two longitudinal white stripes between three of a light brown color, while the face, the antennae and under side of the body and legs are white. This beetle is about three fourths of an inch in length. It comes forth from its bienniel hiding place in the trunks of trees in its perfect state early in June, making its escape in the night. During that time it only uses its wings in going from tree to tree in search of companions and food. In the day it keeps quiet among the leaves of the, trees which it eats during the existence of its perfection.

During the months of June and July the eggs are deposited on the tender bark of trees, on or near the roots, during the night, and are always concealed and shielded under or behind some grass or rubbish, where the eyes of the few birds we have or the fruit growers do not notice them. While the age of this mischievous insect is two years, we will find them every year, and they require our utmost care and attention.

Several methods have been suggested for the destruction of this pest; one is to run a wire after them. This is impracticable, from the fact that the insect gnaws itself in every direction, and filling up the excavation after it with its castings, thus making it impossible to reach it; and to run a wire into the holes left open, is to try to kill it in the trunk after it has left it. Another method is to smother it, and that is equally ineffectual. A third, and the only sure remedy, is to cut after it, and crush it. In the latter method trees may be saved, if not too much injured, while if neglected, their destruction is certain, it being only a question of time.

My experience is that a preventive is better than all the cures named, and the best preventive that has come under my observation, is to remove the earth around the trunks of trees, three or four inches deep, then wrap the trunks with heavy paper, well coated with coal tar, to make it impervious to water, or some kind of cloth well coated with coal tar. The wrappers should extend high enough up the trunk to be above the grass. The earth should then be returned, and heaps of sand or coal ashes put around the trunks several inches high. If the beetle deposits its eggs on these coverings, they may hatch by the sun, but will immediately perish for want of nourishment; and if the eggs are deposited above the wrappers, the mischief will be easily noticed by the miniature insect ejecting its castings after it, and can be removed without injury to the trees. But to make sure, every tree so protected must be examined annually during the month of May, and where the wrapping is defective, it must be restored.

Having, as briefly as possible, given you my experience with this very troublesome and destructive insect, its destruction and prevention, I cannot close without expressing the conviction, that if many years ago, while fruit was regular and abundant all over the cultivated country, if at that time more efficient enactments had been passed, and relentlessly applied, and adequate punishment inflicted for the wanton and indiscriminate murdering of our common insectiverous birds, such as the different kinds of flickers, wood-peckers, robins, larks, and various other birds, who partly or entirely subsist on insects, we could to-day enjoy an abundance of fruit in the most perfect condition, so far as the insect nuisance is concerned, as well as the sweet warbling songs of birds that were once common, but are now seldom, if ever, to be met with. The same that has been said concerning these birds as regards our fruit crops, also applies to our cereals.

There is no class of people in this country so injurious to the fruit growers and consumers, and the general agriculturist, as the bird slayers. Late as it is, a relentless legal warfare should be carried on against them.

In connection with the reading of the essay, Mr. Keller presented a number of specimens of the apple tree borer at different stages of growth, and also wood that had been penetrated by the worm.

Remarks on the essay being in order,

Mr. **MUSSELMAN**, of Somerset, said: I have some practical knowledge of the borer, in connection with the ownership or supervision of four or five orchards. The report just read is a very good one; and I agree with the writer in every respect, save one. Why not put on a bandage that is long enough, without fail? I go about in the spring, having armed myself with a strong awl, a wire, and penknife. It is an easy matter to discover where the borer is. I have lost only one tree out of a hundred by following that course. Sometimes a small tree is ruined before you discover it; but after a tree is six inches in diameter, it is safe from the borer. The only remedy is to watch for the borer, and find and destroy it.

Mr. **CURTIS**, of Crawford. I was very much interested in the essay; but I must differ a little with the gentlemen who has just spoken, though I indorse the essay in the main. My experience has been, that if our young trees are watched closely, it will be found that the egg of the borer is deposited in June or July, or August at furthest. If our ground is kept clean, we may notice by the dust something that indicates the borer, and it can be taken out in the fall. One tree last season I had nothing around to keep it moist. I found eight borers in it, but took them out so early in the season this year, the bark is so nicely grown over the places, you could not see where the borers were taken out. Where the ground is hoed—and of course we all hoe young orchards—and the trees are well banked with earth to the hight of three inches, more or less, then after the egg is deposited, at the last hoing, say in July, we can see very readily where the borer is, as we go past the trees, and before they have done much harm. I think it is a great deal better to take the borer out in the fall than in the spring.

Mr. **BEEBE**, of Venango. One experiment is not always a full test of the value of anything. Three years ago I took three gallons of whale oil soap, four of water, half a pound of Paris green, and two ponnds of sulphur. To these articles I added enough lime to make the usual stiffness of a whitewash, and washed the trees thoroughly. The lime enabled me to make the mixture adhere to the trees properly. During that year I was not troubled with the borer; found but one or two, and think they were in places not touched by the wash. Last year I neglected my orchard. This year I cleaned them out as thoronghly as I could; but instead of taking whale oil soap, I took two gallons of common soap, with a half a pound of Paris green, four gallons of water, and two pounds of sulphur, and added enough lime to make an ordinary whitewash. Last week I made a thorough examination of the trees, without finding a single borer. I made this as an experiment. It seems to be effectual, the preparation good, and of such a character as to invigorate and stimulate the bark. I stripped off the loose bark from those trees that had any on. I find that the loose bark proves a harbor for insects.

Prof. **HAMILTON**, of Centre. Which of those ingredients does the gentleman think acts as a preventive? Is it the combination, or simply some one of the articles?

Mr. **BEEBE**. I have no means of knowing, sir. I conceived the idea of putting in the poison, because I thought it would be destructive to the insects. I consider the sulphur and soap excellent ingredients to apply in any way. I know they are destructive to the louse. The articles combined not only destroy the borer and insects, but they seem to have helped to make the trees vigorous. As I said, I neglected the trees last year, and did not think it necessary to pay much attention to them this year, until I went and looked. And after the application this year, I examined them a few days ago, with the result stated. The wash is a good one for the trees, and well worth trying, and a man can go over quite a large orchard in a day.

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The next essay in order was on

THE SELECTION OF DAIRY COWS BY OUTWARD MARKS.

By Captain J. C. MORRIS, *of Susquehanna.*

I have been requested to give you my views, and particularly my experience, in the selection of milch cows that would be profitable for the dairy, and also to give you the *outward* marks and signs that indicate such a cow, especially in illustration of the "Guénon system," so called.

This subject of selecting cows, is, to me, very familiar, and has been for the last twenty-five years. It is going over the same ground that has been gone over in every conceivable form that man's imagination could place it in, and always striking at the same points. Nevertheless, it will have to be repeated over and over again, until every dairyman and dairyman's son is impressed with its importance, and interested in the dissemination of such knowledge.

You, no doubt, have had such cows described to you many times before, and I am not egotistical enough to suppose for a moment that I can give you many (if any) new points. Neither am I, in imagination, going to waft myself on seas of milk or ships of amber, but by plain common sense, plain talk, and by the drawings that I will show you, pointing out the different marks and signs of a good cow, I hope to impress upon your minds that a good cow *can* be selected without the trouble and expense of keeping her a year before you have come to the realizing sense that you have made a losing investment.

The growing magnitude of the dairy interests of our State is, probably, only realized by a very few, even of the most sanguine. I supposed that the principal interests of this portion of our State was in your extensive production of *oil*, and that the agricultural interest was of minor importance; but I am glad to find you interested in other kinds of oil besides petroleum. I freely admit that I was quite ignorant of the extent of your dairy productions in this portion of our State, until recently, though living in a dairy district myself. Bradford, Susquehanna, Wyoming, and Wayne, all having a reputation for their fine butter and cheese, and living very much upon that interest. With all this reputation, I do say, that I doubt very much if there is any other class of business that, as a whole, is done in seemingly so indifferent a manner.

There is no animal that has been bred so carelessly for the business for which it was intended as the milch cow, and no class of men so blind to their own interests as the dairymen. They are, as a general rule, purchasing, feeding, and milking cows which barely, if at all, pay for their keeping; raising calves of the same sort from cows that are not fit to breed from; using sires without the least consideration whether they are from good milking families, or asking the question whether their dams ever gave *any* milk! With this reckless way of breeding, how is it to be expected that dairying *can* be a success?

To breed superior cows for the dairy, the first point is, to select your cows regardless of race; but do not purchase a cow because she is cheap, they seldom, if ever, pay in the dairy. Such as have shown themselves to be deep, rich milkers, whose ancestors have shown and proved themselves good cows, and who stamp the same characteristics upon their offspring, seldom, if ever, miss, providing they have a fair chance. By selecting a bull from a cow of the same good qualities, and raising and selecting your own calves, I will guarantee that, in a very few years, you will have a herd of cows that will not disappoint you, either in quality or quantity of milk, providing you give them the proper food, and enough of it, to manufacture milk from, for you are all aware that the cow is but a machine for secreting vegetable substances into milk.

The sire should be as carefully selected as the cow, looking back for generations, to be certain that there is no break in the milking qualities of either dam or sire. Use a thorough-bred bull. I will not designate the breed, for in so doing I might trample on the opinions of other men, who have as good a right to their judgment as I have to mine; but by using such a bull you have his pedigree to assist you in ascertaining the milking qualities of his ancestors. Who would think of using the Clydesdale horse upon a thorough-bred mare for the race course, or a hackney upon Goldsmith Maid, expecting her to produce a trotter? Yet, gentlemen, how many of you use a little scrub bull, without any knowledge of his ancestry, expecting (if you give it more than a passing thought) to raise calves which are to take the place of your worn out cows?

It is not always the "handsome" cow, I will presently describe to you, that gives the largest quantity or the best quality of milk, for I have seen among the natives some very ordinary and ill-shaped cows, that were extra fine milkers; but they, like all other good cows, were well marked both in the escutheon and the lacteal veins.

I would breed from such a cow, using a thorough-bred bull, with undoubted milking qualities, for it is an easy matter to breed all the fine points as far as beauty is concerned.

If the judges at our county or township fairs were men who understood the points and marks of a good dairy cow, and would not have their judgments swerved by the general outline of symmetry and other points of beauty in the animal, but would carefully examine the texture and turns of the hair, the skin, flesh and other signs and marks, and decide according to that rule, showing and explaining to the inquiring minds *why* they have given the premium in the case, they would be doing their county or town, and in fact the whole country, a lasting service. But we cannot have such judges at any of our fairs and exhibitions, until our men and boys are educated in such knowledge. On the contrary, I am sorry to say, there is very little regard shown in selecting judges as to their qualifications to decide intelligently upon the subject required of them; many of them showing little or no knowledge of the business before them.

There is another point to be looked after, and that is, the care and training of the heifer the first year after her coming into profit. This is a point I look upon as very important, and not receiving anything like the attention it deserves and requires. A good heifer can be easily spoilt by careless milking, and allowing her to dry up after being in milk a few months, for she is very certain to go dry at the same time ever after. She should be well fed, both in her first and second years, and milked nearly up to her coming into profit the third year.

My own experience tends to the belief that a heifer coming into profit at *two* years old, provided she has been well fed, and grown to a suitable size, makes the best cow for dairy purposes, being stimulated in her milk secreting qualities. While being fed and forced for size until she is *three* years old, tends to develop the laying on of muscle or beef, and it requires a longer time to develop her milking qualities, though she may have all the *points* of a milker.

All cows are inclined to deteriorate, and nothing but good breeding, good feeding, and good care will keep them up to the standard you wish to have them in for milk.

The best cows are of a medium size, as a rule, and small boned. The head is small and rather long, with thick wide lips which give the muzzle a flat appearance. Eyes large and bright, with a placid expression; ears large and thin, with soft, silky hair, and with rich orange-colored dandruff on the inside; horns set on a high pate, inclining forward at the base, and light, tapering, and clean. The annual rings on the horns not deep, though depth of the rings indicates the condition in which the annimal has been kept during the year. When well kept, they are indistinct and blended together. Neck long, clean, and thin, but not slender; well cut up under the throat, and thickening as it joins the shoulder, giving the shoulder a finished appearance. The brisket rather thin, well down and clean from the dewlaps; shoulders should be thin at the top of the blade, broad at the points, which should be nicely rounded; the shoulders lower than the hips. Fore legs clean and straight, and squarely placed under the shoulder. Back inclining upwards towards the hip; chine full, which gives a full appearance to the crops; ribs rather straight and flat, full over the heart, showing a strong constitution, for everything depends on that in a milch cow. She *must* have plenty of room for the action of her heart and lungs, giving free circulation to her blood and her breathing apparatus. You all know, gentlemen, that in selecting a horse for endurance and work, whether for speed or draft, you look for the marks of a good constitution, and you look for them in the chest and heart as well as in other places, and although we are not looking for speed in a cow, yet we do want health, vigor, and constitution. The loins should be broad and hips wide and high; rumps up even with the hips, though I have seen very good cows with low rump, but they have in every case been otherwise uncommonly well marked. Pelvis should be wide, giving plenty of room for the tail twist, or perinaeum, wide but well cut up, which in all good cows must be the case, to give plenty of room for the udder. Thighs thin, the hind legs a little crooked, fine below the hock with a good-sized, long foot. Doctor Loring, of Massachusetts, who is considered one of the best authorites in that State, says: "No cow can do the work of a dairy that has a small short foot." The tail should be long and tapering, but I cannot find any required length necessary. The udder should be long and broad, well set up between the thighs, with good sized teats set well apart. The belly should sag a little in front of the udder, and rise as it approaches the brisket, and should be compared with the size of the cow. Do not look to the *color* of the hair, horns, or muzzle, for they can be bred any color or shape.

Now, after this general discription of the "the handsome cow," we will go to the points which I am called upon particularly to detail to you, and without which there can be little or no milk, for *all good* milkers have them. The hair must be soft, indicating a soft elastic skin, which you will find to be the case by taking the skin in your hand, and if it be soft and pliable, like a kid glove, you are safe for either milk or beef. If, on the contrary, the skin feels harsh and hard, with a crackling sensation as it passes out of your hand, *let him or her alone.* You can have neither a good cow nor an animal that can be fed for beef. You never saw soft, smooth, bright hair grow upon such a skin. This is the first test and an infallible one. Next pass you hand under the belly of the cow and you will find the so-called "milk veins." They are also an infalliable indication of the good qualities of a cow, the larger the veins the better are the indications. In a very good cow you will sometimes find the veins branching off, and making four instead of two, but their general capacity is the same.

The larger the veins, and the more irregular or angular they are, the more sure you are that the cow is one of the first-class milkers. You will find two orifices in the belly of the cow, where these veins enter, and they will be in size according to the size of the veins; they should be of the same size or she is a blemished cow. Also you will find by passing your hand along her back cups or cavities, which is another indication.

Before proceeding further, I must tell you something of the "Guénon," whose name has become so famous.

Mr. Guènon was a Frenchman, living near Bordeaux, who, in 1828, first called attention to a system he had discovered by which a cow could be judged as to the quantity and quality of milk she would give, and the length of time she would give it after calving.

In 1837, after twenty years of observation and research, Mr. Guènon had succeeded in discovering or establishing certain natural and positive signs which constituted the basis of his system. At that date the Agricultural Society of Bordeaux appointed a committee (for they could not but look on with distrust at the proposed trials of his method—a method which was to be proof against error) to investigate and examine the system.

After a large number of cows and heifers were examined in different localities and different pastures, the committee pronounced his system "infallible," and the society presented him a gold medal; proclaimed him a member of the Agricultural Society of Bordeaux; ordered that fifty copies of his work be subscribed for, and a thousand copies of the report be distributed among the agricultural societies of France.

This is a point for our State Board to reflect upon.

Some time after this, I think in the following year, the Agricultural Society of Aurillac in its report said: "The method of Monsieur Guénon has not the merit of being a brilliant theory; it rests upon facts and long experience. It is only after repeated trials, and twenty-five years of toilsome researches, that its author has accomplished the task of establishing it." They also awarded him about the same as the Agricultural Society of Bordeaux; after which the National Assembly's Committee on Agriculture unanimously voted to confer on him a pension of three thousand francs a year in consideration of his discovery of an infallible method of determining the capacities of milch cows. Now, gentlemen, after the endorsement of such men as must have been placed on these committees, is it not time that *you* should look into it?

At the age of fourteen, young Guénon with the habits of all boys of his station in life, for he was the son of a gardener, drove his father's only cow to and from the pasture, and while carding and scratching his old companion, he observed a sort of bran or dandruff detach itself in considerable quantities from certain spots on her hind quarters, where the hair met from different directions, or what we call a "quirl" in the hair. This attracted his quick sense of observation, for he had become possesed with the idea that he was destined to make some important discovery in the branch of industry which he followed. The cow, which he drove and milked, was a good milker, and comparison was now what he needed. He knew his old cow perfectly, and after comparing many other cows with his own, he came to the conclusion that there were marks by which he could designate a good cow from a poor one. He worked on, year after year, until he had got his method so systematized that he was ready for an examination, and in 1828, he first called attention to the system he had discovered; which I will now go back to describe and explain:

The udder should be covered with a soft downy coat of hair, and in front of it, the hair begins to turn its course back between the teats. Its width is to be examined; for the wider the belt or shield the better and surer are the indications. This belt or escutcheon runs up to the pelvis, and must be examined, as its width, without a break, is the points on which Guénon forms his opinions as to his best cows, to which *he* gives the name of "The Flanders Cow." That, with the width on the thigh, is a *sure* indication of the best cows. I *never* saw it fail, and have yet to find my first mistake. The only trouble is, there are but few cows which have it in a perfect form. The escutcheon varies in shape and outline, which induced Mr. Guénon to divide them into eight classes, and eight orders in each class. The first order being the best, giving the most milk, and the eighth order being the poorest, as you can readily see by examining the drawings.

There are exceptions, such as Guénon calls "The Bastard," and some others, (among whom is my friend's and your neighbor in the adjoining State, Mr. Baldwin, of Ohio,) "The Bogus Cow," whose marks I will here explain. These are just the same, to the casual eye, as they are upon any of the classes, to all appearances, both in escutcheon, and in their milking qualities. They are as fine milkers, as far as quantity is concerned, for the first two or three months after calving, or until they are again in calf. Within two or three weeks after this, they begin to lessen in quantity and quality, and in a couple of months they are worthless for the dairy. This I know, not only from inquiry; but, also, by occular demonstrations for I have such a cow in my own dairy, and have kept her for three years, experimenting upon her. As long as she is kept from breeding, she is as good a cow as I have for quantity of milk, and of fair quality, until after she gets with calf. This cow, as I said before, has all the marks of a Flanders cow—large, knotty, milk veins, large, wide escutcheon, running wide and full up to and around the pelvis, two mirrors, large and well formed—but on examining the escutcheon closely, I found the hair thro' the center of the escutcheon, and up the pelvis, long, coarse, and bristly—different from that of any other cow I have in the diary. The skin has a lightish red appearance. What little dandruff there is, is dry. and hard, very much of the road dust appearance.

I have found but few first class cows of the Bogus kind, where they were born so, but I have found several that were made bogus by bad training and careless milking.

Now, gentlemen, you can readily see the value of this system, for by a knowledge of it, you can tell just where to place your stock in the different classes and grades. You can pick out your best cows, and part with or fatten your worst. You can tell which yearling or calf to keep, and which to dispose of to the butcher. I will say to you, that I have never been deceived in purchasing a cow since I studied Mr. Guénon's system, and took it for my guide.

A late writer in the *Country Gentleman* says, "there is *no* royal road to cow knowledge;" but *I* say, gentlemen, there is a royal road, and he who will follow out this system understandingly will *not* be deceived. Guénon was the first discoverer, and like all discoveries, it has been somewhat improved upon. Some other points have been discovered by gentlemen of our own State; Messrs. Harvey and Hazard, of Chester county; Mr. Blight, of Philadelphia; and also Mr. Baldwin, of Ohio, have made valuable additions to it, but do not undertake to detract one tithe from the general principle.

Thanking you for your attention, I close my remarks, but will answer any questions you will give me to the best of my knowledge, and will explain these drawings and charts, so that, I think, you will have no difficulty in gaining an insight to "the Guénon system."

Mr. MORRIS illustrated his essay by a number of fine drawings, showing the different classes and orders according to Guénon, and gave a plain exposition of the whole system. The marked attention with which his remarks were received by the large audience was a strong proof of not only their interest in the question, but also of his ability to explain it. Those of our readers who are interested in this matter will find the system explained and illustrated in the report of the State Guénon Commission, appointed by His Excellency Governor Hartranft, at the request of this Board.

The essay and remarks of Captain Morris being open for discussion,

The SECRETARY. Inasmuch as we believe that milk is tallow turned in another direction, is not the theory as valuable in selecting beef cattle as for cows?

Mr. MORRIS. Yes, sir.

Mr. BEEBE. Do you not find those marks of the Guénon theory on cows of heavy heads and shoulders?

Mr. MORRIS. Yes, sir. I give in my description what I call a handsome cow. But you find these points in a measure. I told you I have found a very great many homely cows, which were used with thorough-bred bulls. Yon can breed anything you please in the cow, sheep, or hog. As I have already said before the Board, I have bred scientifically with rabbits. And I got so I could breed a good, square-looking butterfly on the rabbit's head. You can breed anything; but you must go about it in a scientific manner.

A GENTLEMAN. What is your choice?

Mr. MORRIS. Durham Short-Horn. I breed for different colors, by choosing the male and the female. For instance, if you want a roan, you would get a red bull, and a white cow. If you wanted to breed red, you would keep on breeding from a red animal. For white, you would breed with a white animal. For beef, you would look for a sire in a bull with heavy fore quarters. A gentleman in an essay at one of our sessions, said that he undertook to breed a certain kind of sheep, but after a certain number of attempts, failed, He did not continue on long enough. He quit just at the wrong time.

Mr. ENGLE, of Lancaster. I looked into the Guénon system twenty-five years ago, and have believed in it ever since; although I have not studied it up as closely as I might have done. As to selection, there is in my neighborhood an evidence that it can be done properly. A neighbor of mine bought a Guernsey bull calf, a number of years ago. He had a small, ordinary farm, and I have been surprised how his young milk cows have improved. There has been a decided advance in breeding from this bull. This proves the idea of Mr. Morris.

Now, there is another matter I would like to know, whether, in Mr. Morris' experience, there can be anything calculated upon in this system, as to the quality of the milk?

Mr. MORRIS. Yes, sir.

Mr. ENGLE. A number of years ago I was in the dairy business, and had a fine large cow. I never had a cow give as large a quantity of as good milk. But just as soon as she was with calf, she would dry down, and it would take her a whole year to recuperate again. Then I had another large milker, and she would hold out, but had some other fault. So I came to the conclusion that you cannot have all the points combined. With my dairy experience, if I could get a cow that would milk twenty quarts a day regularly, or one that would give thirty to forty irregularly, I would prefer the one giving the least milk. With the dairyman, quantity is desirable.

Mr. MORRIS. The marks are not on her that I have indicated.

Mr. ENGLE. At what age of the calf do you consider it safe to judge?

Mr. MORRIS. In riding around the country, I see great numbers of young stock. I very often jump out of my wagon, and over into a field, to look at the animals. A very short time ago I was riding along the North Branch, and saw a number of calves. Two of them struck me as being uncommonly fine. I jumped out and went over, and I said to the man: "You have some good calves." "Yes." "Are you going to sell?" "Yes." "I want them," pointing to the two. "Those are the calves I am going to keep; they are from the best cows I have." I knew they could not help being good. They had all of the wide escutcheon of a good cow.

The SECRETARY. Suppose these marks to be equally well developed on two heifer calves of six months old. One of them I feed well and take good care of, and the other I neglect and feed but poorly. It will, of course, affect the future quality of the cows, but will it interfere with the proper development of the marks?

Mr. MORRIS. It will not alter the marks; but it will make a difference in the cows. The best treatment will produce the best cow.

Mr. WILSON, of Juniata county. Do you believe in "hollow horn," or "wolf in the tail?"

Mr. MORRIS. No, sir. The man who would undertake to cut off his cow's tail, might as well cut off her ear. No man, who will study veterinary surgery, will say that there are such things. I believe just as much in them as botts in horses. They are all about the same thing.

Mr. BEEBE, of Venango county. There are hundreds of cows, some fat and some poor. Some of these cows begin to look badly; refuse to feed; their eyes have a deadly look; the eyes are closed, and there are other indications of debility. I do not care what you call it. In course of time that disease comes to a point, when many seem to think it necessary to bore the horns, and when it is alleged that by so doing relief is given. Now, science owes it to the farmer to tell what that disease is, and how it can be treated. I know our papers say there is no such thing. I know it will be put down with a sneer; and yet there is not a farmer but knows he sees these symptoms again and again. When you say to farmers, "There is no such disease as hollow horn," then *you* name that disease and its treatment. The case is, that when your patient is dying, and you write to the editor of some paper to know what kind of treatment should be resorted to, the reply comes: "You must feed her well," when she will not touch a mouthful! [Laughter and applause.] I appeal to the experience of every farmer here, if he has not had such a disease among his cattle.

Mr. MORRIS. I have had such cases of my own, but I do not think I ever had one so poor that she had a hollow horn, or that I had to cut her tail. But I have had cows that had fevers. A cow loses her strength. She goes down and down, until she comes to the condition described. She had been thrown into what I call a fever. Now, as to the only point made, that she will not eat. The way is to put the food down her throat with a horn. In the first place, you want to remove the trouble. The best thing would be to give her a light physic. I have always found that salts have served me better than anything else. After I have physicked her—which I have found an easy thing to do—then the next thing is to build her up.

Then, in some cases, there is milk fever. I have had cows with milk fever, where I have been told that I could not save them. I have said that "as long as there is life, there's hope." With a few drops of aconite, I have brought her through, straight as a string, although I didn't go to bed for two nights. I felt well re-paid in successfully combating the disease.

A GENTLEMAN. Do you discover that cows with very dark horns are liable to give less milk?

Mr. MORRIS. Yes, sir; I wouldn't take such a cow.

Mr. BEEBE. Then you denominate those cows that have "hollow horn" cases of fever?

Mr. MORRIS. Yes, sir; she has what you call the "hollow horn," and all cows have the hollow horn just as soon as they have a fever. I don't care what it is; as soon as the circulation becomes clogged, then comes the hollow horn. You take hold of the cow's horns, and you will find them cold. There is no mystery about it. These things with us farmers require a great deal of care and attention. I have several farms and a good deal of stock; but I make it a rule to go and look after them just as often as I can. Three times a day I go into my own yard. I would not hire the best man with the expectation of his doing my work. He has not the same interest that I have; it is not natural. He does not own the cattle.

Mr. BEEBE. There is a certain and distinct disease that we call "hollow horn." The symtoms indicate what they name the disease, "hollow horn." I want scientific men, if it is not hollow horn, to say what the disease is.

Mr. MORRIS. I know that some of the fattest cows have "hollow horn." Any cow that has a fever, or is absolutely sick, has what you term "hollow horn."

Mr. WILSON, of Juniata. In regard to the end bones of the tail, they sometimes become absorbed and disentegrated, you can easily tell that by feeling the parts. This malady is commonly called "wolf tail." The remedy usually is to cut the tail and put in salt and pepper.

Mr. MORRIS. Does not blood circulate there? If that part has not the blood circulating in it the hair will die and it will fall off. Now, for a cure, people will come along and split the cow's tail. How would you like to have your fingers split and salt put in it? That is on the same principle that you treat the cow. As long as the cow is not affected, and it is not a running sore, let it alone.

A GENTLEMAN. Is such a cow likely to be in good health?

Mr. MORRIS. I never saw a cow with that disease, and know nothing about it. I have seen a handsome switch on the tail; perhaps it had several inches with no bone in it. A cow could have health and not have bone there.

THE LAWS OF BREEDING AND THE CAUSES WHICH INFLUENCE THE CHARACTER, COLOR, FORM, AND SEX OF THE OFFSPRING OF OUR DOMESTIC ANIMALS.

By THE SECRETARY.

In my examination into the question involving the laws of breeding, I shall assume, as a corollorary upon which to found the argument, that in breeding, as in all other results in nature, nothing is left to chance, and that each effect, however trivial it may seem, is but the working out of some fixed law, unrecognized it may be, but none the less powerful or certain in its results, because unknown. The question may then very properly be asked, why, if the laws are of such a fixed character, the results should be so varied and often so different from that which might very reasonably have been expected? To this I can only answer that these laws may all be reduced to one of two classes, one of which, for the sake of destruction, we may style the laws of hereditary transmission, and the other the laws of variation.

By the action of the former, the offspring should always resemble or represent a mingling of the character, color, and form of both parents; that such results are not always produced is due to the action of the laws of variation. To illustrate: By the operation of one series of nature's laws we should always find the wind passing in a well-defined and general direction around the globe, but by counter causes and counter currents this course is changed. Occasionally the first series of laws assert their power and produce a general storm, the direction and speed of which may be calculated for miles in advance. So it is with the conflicting laws of hereditary transmission and variation, the former working in a certain well-defined direction, while the latter are at cross purposes, producing seeming confusion.

If the former alone had an influence, the work of the breeder, who aims to improve his stock, would be a simple one, and, instead of being slow, and subject to many disappointments as at present, would be a succession of rapid strides. The whole work of the intelligent breeder is a constant series of struggles against these laws of variation, and hence it is to these mainly that I shall call your attention.

Preceding our general investigation into the matter, there are a few principles of a general nature to which I wish more particularly to call your attention, and which may, perhaps, seem to be more appropriate when we come to investigate the question of sex, but which have a general bearing upon the whole subject under investigation.

In her provision for the reproduction of species, nature seems to have followed a general law which involves the use of two sets of organs which we have termed male and female; from the organs of the female the *ovum* or egg is produced, and when fully mature, which occurs only at periods of heat, passes out. The organs of the male produce a fluid which contains (in a healthy and perfect animal) the *spermule.* When the ovum is mature its contact with even the smallest individual spermule will cause pregnancy. In some classes of animals, as the pig and dog, the ovum or eggs are detached in masses and a litter is produced; in most domestic animals but one is detached at a time, but in certain cases, and under certain cases, two or three are detached and produce twins or triplets.

From this it is evident that we may, in general terms, assert that the male can only influence the progeny through the spermule, but the female may exercise an effect in various ways and from many causes.

Of the laws of hereditary transmission we need say but little, for their working and results are so evident that any one may in an amature way understand them. After providing a perfect and unblemished male it would seem that the breeder could do but little more to assist in the carrying out of this special class of laws, and if the offspring does not then resemble one or both of its parents, the difference can only be charged to the effect of the laws of variation.

Before passing to a consideration of the laws which cause variation in breeding, it would seem proper that we should give some attention to barrenness and its causes, for this is a prolific cause of trouble, especially to the breeder of improved stock, of which pigs are a prominent instance, the very improvement of the breed seems to be productive of barrenness.

The possible causes of barrenness are many, and the length of our paper will only allow of the enumeration of the most prominent.

If the period of breeding is put off until late in the life of the female, it would seem that the difficulties in the way of the production of offspring are increased, and often become so great as to effectually prohibit it. Too great a deposit of fatty tissue may also effectually thwart the desire of the breeder. It has been claimed that an excess of fatty matter effectually closes up the passage leading from the ovary, and although all the other functions are perfect, the ovum, from this cause, cannot pass into fallopian tube, to meet the spermule of the male. The remedy is to reduce the animal by cutting off a portion of the supply of food.

Improper food may produce barrenness, not only by producing early abortion, but also by preventing the proper development of the ovum, or by causing its detachment from the ovary before it is fully mature. Ergoted grasses or grains produce this effect, and it has been claimed by good authority that in many cases rye, by producing an excitable condition of the ovary, may prevent pregnancy, or if properly used, may bring on the period of heat at any desired time.

With some females the excitement at this period of heat is so intense as to effectually prevent pregnancy; this can only be obviated by preventing access to the male until very late in the heat. In some cases disease may permanently close the mouth or neck of the womb, or disease of the ovaries may prevent the proper exercise of their functions. Among thorough-bred stock there is, perhaps, no cause so productive of barrenness as close or in and in breeding. While we admit the necessity, to a certain extent, for close breeding in the production of the best class of animals, yet the certainty with which barrenness follows should cause great caution on the part of the breeder. In some cases a failure to produce pregnancy has been charged to a defect in the female, when the fault was in the male, whose organs may have been injured by disease, or rendered useless by malformation.

In our consideration of the laws of variation we may thus sum them, previous to a special consideration of each: *Prepotency*, or the Power to fix the Character of the Offspring; *Reversion*, or Breeding Back; *Effect of Previous Impregnation; Imagination; Accident; Disease;* and though not strictly in place, we may add, *The Effect of Soil, Food, and Climate.*

Prepotency,

Or the power to transmit character, may be intensified or increased to an almost indefinite degree by constant and careful selection, and if properly managed, is a power in the hands of the intelligent breeder to counteract, in great measure, the other laws of variation, and it is for this reason that we have assigned it the first place in our list of causes. By constant and careful selection this power may be rendered so strong as to warrant the claim for a new breed which is capable of transmitting its peculiar qualities to its offspring with a great degree of certainty. It is by this careful selection that we have obtained from the same original stock our Durhams, Jerseys, Ayrshires, and other breeds, and the door for further improvement and other new breeds is by no means closed. But notwithstanding the care which has been exercised by such men as Bates and Colliery, we do not find that the prepotent power of even our best herds is invariably able to cope with other opposing laws of variation. Just how far the selection must be carried to ensure the desired result no one has proven, but it is in the human race that we find the nearest approach to perfection. A novice in physiognomy can select from a crowd an individual of the Jewish or Gypsey race; the characteristics of each are distinct from those of all others, and fifty per cent. of the blood of either will prepotent or overrule the mixed blood of other nations. It is true that we find individuals in all races which possess this power to almost as great a degree, but this is rather due to what may be termed accidental causes than to the working out of any fixed law.

Prepotency varies in its power with the sexes of the different breeds, and with individuals of the same sex. In the horse tribe, it seems to be strongest in the male. The offspring of a common mare and a male ass, shows the prepotent power of the sire, not only in the form, but also in the character. The offspring of the female ass and male horse, in like manner shows the prepotent power of the sire in the form, but it would seem that in character the tendency is towards a reversion, which produces an animal of wild and untractable disposition, swift of foot, and comely in form, but going back over generations of improvement, to the disposition of the wild horse of the plains. Old Hubback had such strong prepotent power that, even at the present day, we may, occasionally, find a calf, which, in the days of Hubback, might have passed as his son by some favorite dam. Eclipse and Herod exhibited this power, mainly in the direction of speed. The former having left three hundred and thirty-four winners, and the latter four hundred and ninety-seven.

A Manx tom crossed in a female of the common species, shows his prepotent power by the production of seventy-five per cent. of tailless kittens; but if the cross is made in a reverse direction, the power is overcome by the male of the common breed. Darwin asserts that the jackall and hyena will prepotent over the dog, and that the Niata cattle, of South America, will prepotent, or overrule, those of common stock. Godine quotes the case of the peculiar goat like sheep, which, when crossed with ewes of twelve other breeds, produced offsprings the counterpart of himself. Orton claims that the Spanish cock has a prepotent power superior to other breeds; and Colin, that the ass will always prepotent over the common horse. No doubt, any member of your Board can supply numerous illustrations, not only of the prepotent power of special breeds; but, also, of individuals, and it is needless to add more to the list.

Reversion, or Breeding Back.

We find this law to be one of the most troublesome with which the breeder has to contend, mainly, because it always exhibits itself more strongly in the reproduction of bad traits than in those which are to be desired, and it often makes itself visible when least expected. With good stock upon both sides, the breeder often finds the offspring to "breed back" to something entirely unlike either sire or dam, and unlike the animal wanted. It is safe to assume, as a rule, that all sudden or violent crosses are productive of reversion. In the hinny, or cross between the female horse and male ass, it shows itself by a breeding back to the character of the wild horse; by crossing two distinct breeds of horned stock, we obtain a reversion to the famous Chillingham herd, which is supposed to represent the original horned stock of the British Islands. In the earlier days of Short-Horn breeding, a cross with the black-nosed Galloway was introduced to give hardiness, and even at the present day the Galloway black nose may be found in our best herds.

The original herd of sheep no doubt had horns, and occasionally our improved breeds will revert to this stock, by the production of horned specimens. The much prized Rumpless fowls, however purely they may have been bred, will occasionally produce a male with fully developed tail feathers. Sidney gives a remarkable case of a litter of Essex pigs, two of which were a perfect image of a Berkshire boar, which had been used in the breed twenty-eight years before. Darwin writes: "The strong tendency in crossed breeds to revert has given rise to endless discussions in how many generations after a single cross, either with a distinct breed or merely with an inferior animal, the breed may be considered as pure and free from all danger of reversion. No one supposes that less than three generations suffices, and most breeders think six, seven, or eight are necessary, and some go to still greater lengths. But neither in the case of a breed which has been contaminated by a single cross or where, in an attempt to form an intermediate breed, half breed animals have been matched together during many generations, can any rule be laid down how soon the tendency to reversion will be obliterated." He further goes on to show cases, to prove that more than twenty generations have not obliterated entirely. The Galloway and Suffolk cattle are a hornless breed, but occasional produce calves having horns loosely attached to the skin.

The tendency to reversion in color is even more marked than that of form or character. Our best South Down flocks will occasionally drop a black lamb, though no cross with black sheep may have been made for many generations. Our best sows of white breeds will sometimes produce spotted or dim colored pigs.

Doctor W. D. Fox allowed seven pure South Downs ewes to be crossed by a pure ram, having two small black spots on his side, and they produced thirteen lambs, all black.

The Effect of Previous Impregnation.

Although we have placed this third on our list of the laws of variation, yet we are certain that it often assumes quite as much power as either prepotency or reversion. A breeder who by carelessness or accident allows a thorough-bred female to be crossed by a scrub or animal of cold blood, wonders why her subsequent offspring by pure males are not what they should have been. A mare, however good she may be, if once made pregnant by a jack, is ever after liable to produce colts with many of the characteristics of the mule. Lord Moreten's Arabian mare, by an escape from her stable, was served by a Quagga, or wild African ass, afterward produced mulish colts by the best Arabian stallions. Colonel, a stallion of Hampton Court, noted for his prepotent power, was allowed to serve all the mares for one season, and was next season displaced by Acteon, a stallion of low prepotent power. All of the colts got by the latter from mares that had been served by Colonel resembled him in as strong a degree as his own colts, but showed no traits of their sire. McGillwary cites the case of two Angus (hornless cows) being served by a horned bull, but next season produced horned calves by the best Angus bull. A white sow once crossed by a boar of black breed can never be depended upon to produce pure white pigs. In fowls, the introduction of a black Spanish cock has been known to so affect the hens that several generations of pure blood has failed to eradicate the color.

It has been asserted that this effect is due to the fact that during pregnancy, by a common circulation of blood, the mother and offspring constitute one organization, and that an interchange of blood takes place, by which the mother assumes some of the character of the offspring, and *vice versa.* Whether this solution be the true one or not, the *fact* stands out in bold relief as a warning to breeders to use none but the best males at all times, and especially for the first impregnation.

Imagination.

From the evidence at hand, there can be no doubt that the imagination of the mother, has much to do with the color of the offspring, and in some cases with the form also. In many cases the prepotent power of one or both parents overules that of the imagination; but in other cases it is entitled to more important consideration than it usually receives. Cases proving this are so numerous that you will have no difficulty in supplying them from your own observation, and hence a few must suffice. The one having the oldest and best record, is that of the striped rods of Jacob, at the watering troughs of his father-in-law; and the effect is, perhaps, more marked in this case than in any other which I can offer.

During the prevalence of pleura pneumonia in England, in 1849, the stables of the celebrated Suttyorn herd of Short-Horns, were whitewashed, and not withstanding the boasted prepotent power of one of the best herds in England, nearly all the calves were white, or had that color predominating.

Mr. Rossiter, of Milford, New Hampshire, reports a case where a cow was skinned in full view of a pregnant cow, which afterwards produced a calf without hoofs or skin in the hock joints, and with lines inside the hind legs, where the skin is usually opened in skinning. Cases of the effect of imagination on the color of the offspring are so numerous that I will not take up your time by enumerating them.

Accident and Disease.

These two causes are so closely connected, and so often distinguished with difficulty, that we can best serve our purpose by considering them together.

That disease may be inherited is so evident that but little need be written on the subject. Youatt asserts that " There is scarcely a disease or malady to which the horse is liable, that is not hereditary;" and we think every breeder of experience will acknowledge that any disease may be transmitted to the offspring. Mr. Scott, of Dryden, New York, furnishes us with a case which exhibits the combined effects of accident and disease, in producing deformity in the offspring. A pregnant mare had a burdock bur entangled in her foretop, until inflammation of the eye was produced. Her foal had the corresponding eye undeveloped, but she has since produced several perfect colts. Darwin quotes DeLucas as authority for a case of a cow having had one horn knocked off, producing three calves in succession, all hornless upon that side. Professor Daniels gives a case, coming under his own observation, where a dog, having a mutilated tail, transmitted the deformity to his offspring. These, and many other instances which might be given, prove the possibility of the rule.

Effect of Soil, Food, and Climate.

The effect of soil and climate upon the character and form of animals, is too evident to need more than a passing notice at our hands. This effect is so closely connected with the effect of food, that we can best treat of them as one. In cold countries, as Iceland, Norway, Shetland, horses and other animals, in a very few generations, become dwarfed in size and subdued in character. A portion of this may, no doubt, be attributed to exposure, but much of it is due to an insufficient amount of nourishment. All our improved breeds of animals have originated in a moderate climate, and on rich and productive soils, and to prevent deterioration or insure improvement, they must be kept in such a climate and on the product of such soils. Improved stock, sent from our northern States into those along and near the gulf, soon deteriorate, and show a tendency towards reversion. Short-Horns do not thrive upon thin, sandy soils, and it is in the limestone soils of New York, or the rich lands of the West, that they attain their greatest vigor and development. The tendency towards reversion seems to be more or less affected by soil, food, and climate. On the rich bottom lands of South America our improved breeds of pigs will retain, if not slightly improve their value, while on barren soils and in cold climates, they will, even with good breeding, deteriorate into the original stock. Although this effect may be retarded by extra care, yet it cannot be prevented entirely, and increases with neglect.

Relative Influences of Sire and Dam.

Noted breeders and writers have claimed that each parent has a fixed influence over certain portions of the offspring. Orton claimed for the sire the limbs, temper, and speed; and for the dam the internal organs and constitutional vigor. It has been claimed, but without sufficient show of proof, we think, that Bates followed this rule in forming his Short-Horns, and that Bakewell had it in view in his sheep breeding. The fact that the originators of this theory entirely fail to agree in assigning the respective parts seems to indicate a weakness in their argument, which, until harmonized, is insurmountable. We are inclined to think that the influence of sire and dam is a question of prepotent power mainly, and the one having this power in the strongest degree will give the most points to the offspring. This question is very ably covered by Doctor W. H. Murray, who, when considering the Arab maxim that "The foal follows the sire," writes thus:

"To account for it. In the first place the Arabs always select their dams with great care. Now, it may be that the word best, as applied to *these* dams, you do not apply to yours. That is, the dam which you would consider best may not be the best in the eye of the Arab breeder. May it not be one that will allow its foal to bear the stamp of the horse? I think so. I have two dams on my farm that could not be sold by a religious man for three hundred dollars, in a matter of trade, and yet three thousand dollars would not buy either of them. Three colts have come out of each, and every colt looked precisely like his sire. Has put his feet, when eating oats, precisely like his sire. Has smelled and muzzled his water before drinking like his sire. Has done everything like his sire. The dam simply carried it, as a mother carries her child, and never marked it at all. May it not be that the old Arabs have such facts in view when they laid down the maxim that 'The foal follows the sire?'"

Sex.

Having passed the questions of character, color and form, we approach the fourth—that of sex—with no small degree of hesitation, not because we have lost faith in the corrolorary with which we started, but rather from the fact that of all physiological laws, those which govern the sex are the least understood, and at the same time the most difficult of investigation.

As is usually the case with special branches of physiological science, the French are in advance in this particular.

Thury early assumed that the sex of the offspring depended upon the maturity of the ovum at the time of impregnation; if this was perfect, and completely developed, a male would be the result; but if not fully matured, impregnation would result in the product of a female. Basing his claims upon this theory, he assumed that if male offspring was desired, the impregnation should be deferred to the latest possible period of the heat; but that if female offspring were wanted, it should take place at the earliest possible period. With that nicety of theory which characterizes him, he even went so far as to assume that impregnation at intermediate stages of heat might produce a female with the characteristics of a male, or a male with no masculine traits except sex.

With his usual acuteness in things pertaining to agricultural improvement, Napoleon took up this theory, and referring it to a commission, had a series of tests instituted on the national farms. The result of these tests, so far as reported, seem to have supported the theory advanced by Thury. In one case twenty-seven males were produced from a herd of twenty-nine cows, and in another, twenty-six females from a herd of twenty-eight. The full acceptance of this theory carries with it the assumption that in dairy herds, where the male runs with the herd, heifer calves should predominate, and that where the male is stabled, or where the cows are taken away to be served, the herd should produce a preponderance of females. Will the facts warrant this conclusion?

Another theory, also of French origin, which has found many supporters in Europe, is that of Professor Verrill, who assumes that the question of sex resolves itself into one of prepotent power, and that the sex of the offspring will follow that of the parent having this power most fully developed. Professor Verrill also claims that this may, like other exhibitions of prepotent power, be intensified or increased by careful selection, or to quote his own words, "That is, breeders of cows desire to have a large proportion of the calves of the herd females. To secure this, let them breed from cows that have a large proportion of female offspring, using a male that has seldom produced a male calf; thus by continusd selection from individuals that breed females only, secure if possible this fixity of character." If, as has been assumed with good show of proof, thorough-breds are of stronger prepotent power than animals of cold blood, it will follow, if Professor Verrill is correct, that such crosses with male thorough-breds will be productive of males, and that Doctor Murry's mares would produce male colts only—an assumption which is not warranted by facts.

A third theory, which has many supporters in this country, is founded on the assumption that the exhaustion of the male is productive of female offspring. It has been asserted, with some show of proof, that if two cows are served in close succession by the same bull, that the last will invariably produce a heifer calf.

The last theory to which I shall direct your attention originated in this country, and is not only very plausible, because most natural, but also of a nature to admit of a test by practical dairymen. The champion of this theory assumes that determination of sex is independent of any action or effect upon the part of either sire or dam, each alternate ovum being productive of male and female, and that the sex of the last offspring being determined an impregnation at the next period of heat will insure one of the opposite sex.

In conclusion, I would urge that the obstacles which lay in the way of investigation, difficult though they may seem, are not insurmountable, and that much may be accomplished by the practical farmer of this or any other State, if they will only unite in the search for truth, irrespective of any preconceived theory or idea. In too many cases, we look for that which confirms our own views, and entirely overlook that which, while it opposes them, might, if properly investigated, lead to a more definite knowledge of the subject.

The essay being open for discussion, Mr. MORRIS, of Susquehanna, said: If we could only be certain about Mr. Stuyvesant's theory; if it were down to a science, like the Guénon theory, we certainly would be a fortunate lot of people. To-day, I might have had some Alderneys. The trouble was, that after I had had nine calves, the two Alderney cows died; and the nine Alderneys calves I had were bulls, and I was left out in the cold. They were driven over to Silver Lake, to Sheldon's bull, and they were got with calf the very first heat.

If I had known it, I would have tried. I first saw that theory in the *Country Gentleman.* This year I will try the experiment, and next year, if I see you, I will give you my views on the subject understandingly. I hope, in another year, to be able to say that we can raise what we choose, as to sex. As to breeding anything, we can do that. It only requires sound sense in the matter, because it has become a science. By sticking to it, you can get what you choose; that is, Shorpshire Downs, Hampshire Downs. They were bred by men who worked with a purpose, and worked until they accomplished it. There was a man in England, who had the finest lot of sheep you ever saw. They were entirely different, yet all had characteristics of the same flock. He bred them for wool, was very successful, and always kept his own couusel.

Mr. EDGE, (Secretary.) Didn't Mr. Bakewell often get a sheep that he discarded? The father and mother were good, but they bred back. Do we not all get poor ones in every breed of animals, and occasionally in our best?

Mr. MORRIS. I do not know. When we breed ten or fifteen years, we come down to a peculiar breed of animals.

The SECRETARY. Suppose I take "Champion," the best bull in our section of the State. Suppose I cross "Champion" on a heifer that has never been served, is it not likely he will influence that heifer's calf for a half a dozen calves?

Mr. MORRIS. Yes, sir; you can see that for five or six generations. You can see that in the horse as much as any other animal, because the horse shows its characteristics.

Mr. BEEBE. I have not critically analyzed this matter, though for fifteen years or more I have kept on my farm fifteen or twenty cows. There has always been a bull with them; but, inasmuch as butter was worth more in winter than in summer, it was immaterial when they came in, and the opportunity was the first heat. For fifteen years there is not a single one to show that proposition. I have a cow nine or ten years old that has came in every year; always had the bull the first opportunity. And I have two other cows that never had more than one calf in six years. My general observation is that it is entirely irrespective of anything of the kind. Last year, out of twenty-two cows, my recollection is that there were but four or five heifer calves in the lot, so that I cannot indorse that proposition from a casual observation, because the bull always runs with the herd. Last year I purchased a couple of what were guaranteed to me to be White Dorkings, five toes and white legs, and put them into a promiscuous flock of hens, composed of Cochins, a game breed, variety colored. In the course of a year they impressed themselves so strongly that I do not know but that every chicken was white and black mixed. So while I cannot give my support to the proposition of every other a male, and every other a female, I have no doubt of the potent power of the thorough-bred to impress upon future offspring.

Further, I have no doubt that a thorough-bred, having first consorted with a scrub, is forever after contaminated. I have observed that for years.

I had a mare of Eclipse stock, and she would not breed from any of our stallions. Hearing that a young colt would get a mare in foal when an older one would not, I had her served by a heavy, large-muscled French horse, and she had her first colt from him. The next colt was sired by an English blooded bay. The resemblance to the first was so close that the two made a well-matched team. Hence I have no doubt about the first impregnation, or its influence upon subsequent ones.

Again: for two years I have been herding a Durham with the stock, and had heretofore been breeding Ayrshires; and many of those calves now, although sired by a Durham, contain the points, to the very indentation in the ear, of very fine Ayshyre blood, although changed.

Mr. ENGLE, of Lancaster. So far as controlling the color and form, &c., of the offspring are concerned, I believe it is pretty well understood, and is of considerable value; but the later theory, of pre-determining the sex, would be of much more importance, if it could be determined on, which it cannot yet be. I do not know whether any of the theories advanced by the Secretary are sustained. I suppose he does not claim them as having been. A few years ago, a German physician asserted that the sex could be predetermined by the different testicles; and came to this conclusion by a dog, I think. He made a variety of tests, and reported thereon, and the theory seemed to be a correct one; but it was afterwards exploded.

There is another theory, that the Secretary did not advance. He seemed to hold that impregnation has nothing to do with the determination. That the sex won't follow. Some refer to the honey bee. For instance, (and I am not so well acquainted with the subject as I might be,) there are three bees, the queen, the drone, and the worker. The queen lays all the eggs, is impregnated by the drone, and the workers feed them; and it is claimed that the shape of the cell and the food determines the sex. They claim that nothing predetermines this, I think, but the care, the food, the light, and the bee. If that is the correct theory, and I think it is, might not that have a bearing upon this theory, which is so much under discussion now-a-days? I simply give this for what it is worth. I may be wrong; but as theories have been advanced somewhat, this will go along with the rest.

The hour of adjournment having arrived,

The PRESIDENT, (Governor Hartranft.) I have been very much gratified with this meeting. I think that very important questions have been discussed, and that we have all learned a good deal; and I hope that our constituents will receive some benefit from our coming together here. While I feel glad, to speak of our present meeting, I regret to say that this will be my last appearance in this capacity with the Board. My term of office will expire the week preceding the next assembly of this body. I will say that my association with the Board has been of such a character that I will be very much pleased to confer with them at any time, both before and after my retirement from official life. As a private citizen, I will be happy to serve you in any way I can, and in case I become a farmer, I will look to you as a guide. [Applause.]

Mr. TAYLOR. I am sure that the Governor would help to assuage our sorrow at his depatrture, if he would but name his successor. [Laughter and applause.]

Mr. FORESMAN. I think I can tell the gentleman that, from my standpoint, without any trouble. [Renewed laughter.] But no matter who he may be, I am sure that we will not get another to take the interest in the agriculture of the State, and in the proceedings of this Board, that our present president has. We appreciate the services he has rendered this body; and we admire him the more for his coming down from his high and lofty position to sit among farmers. This is something not customary, and we thank him for it. For this and other reasons, we are sorry to part with our present president. The only solace we have is that the incoming Governor will not fail to take his position with us as presiding officer. As the Governor knows that I am opposed to him politically, I take this liberty of speaking upon this occasion.

Now, to the people of Titusville, I wish to say that it has been the general expression of this Board that we have been highly entertained, and that we are pleased with the people here. We have not only found wealth and culture here, but grand and highly cultivated farms; and, best of all, many pretty and winsome ladies. I hope that at some time in the near future, the Board will see proper, in its wisdom, to assemble here again.

Mr. BANKS. I rise to approve of what the gentleman who has just preceded me has said. The members of this Board have talked over these matters without regard to politics; and we have considered the matter of succession to the presidency. I cannot re-call a meeting of this Board which you have not presided over; and I can say with pleasure, (and all the members of this Board can say so, too,) that you have presided over our deliberations with great urbanity and impartial fairness. It is not expected that Governors of States shall preside at meetings of this kind, yet you have been with us all the time, no matter where we have met, and regardless of the great pressure of your other duties. I move, therefore, (to my brethren of this Board,) and the Secretary can put the question, that our thanks be tendered His Excellency, Governor John F. Hartranft, for the very thorough, faithful, and efficient manner in which he has discharged his duties as our presiding officer.

The motion was unanimously agreed to.

The PRESIDENT. I, of course, thank the Board for the compliment, although I do not think I deserve anything of this kind. I did simply what was my duty, and nothing more.

On motion of Mr. BANKS, the Board then adjourned.

REPORT OF THE PENNSYLVANIA GUENON COMMISSION.

At the annual meeting of the Board held January 2, 1878, it was

"*Resolved*, That the president of the Board (His Excellency Governor John F. Hartranft) be authorized and requested to appoint a commission of experts, who shall inquire into and report upon the reliability of the Guenon or escutcheon theory for selecting milking stock; said report to be made to the secretary of the Board on or before the 1st of November next."

In accordance with this request, His Excellency Governor Hartranft issued the following commission:

COMMONWEALTH OF PENNSYLVANIA,
EXECUTIVE CHAMBER, HARRISBURG, *April 24, 1878.*

To GEORGE BLIGHT, Esq., *of the city of Philadelphia;* CHALKLEY HARVEY, Esq., *of the county of Delaware, and* WILLIS P. HAZARD, Esq., *of the county of Chester:*

GENTLEMEN: I have the honor to inform you that you have been duly appointed a committee by the State Board of Agriculture to investigate and test "The Guenon Milk Escutcheon Theory," and report the result thereof to the secretary of said Board.

JNO. F. HARTRANFT,
Governor and President of the Board.

November 1, 1878.

To the Honorable JNO. F. HARTRANFT,
Governor and President of the Board of Agriculture:

YOUR EXCELLENCY: In compliance with the commission tendered us, we beg leave most respectfully to report that we have visited a number of herds and have examined two hundred cows, the result of which is herewith submitted.

Having performed to the best of our ability the duty assigned us, we beg leave to be discharged from further consideration of the question.

Respectfully yours,

GEORGE BLIGHT, *Philadelphia,*
CHALKLEY HARVEY, *Chad's Ford,*
WILLIS P. HAZARD, *West Chester.*

The Pennsylvania Guenon Commission having been appointed "to investigate and test the Guenon or Milk Escutcheon theory, and report the result thereof," respectfully report that they have examined two hundred cows, heifers, and bulls, and the result of their examinations has been to convince themselves and others of the merits of the system, of its exceeding value to the practical farmer; and they believe that if generally followed for twenty years, the value of the neat cattle of the State would be increased vastly, the amount of milk and butter produced would be much larger, and the quality of both articles better, while the quality of the meat would be improved. Having believed in and practised the system for many years, they would add that their recent extended and careful examinations and contact with a number of owners of all grades of stock, has tended to confirm them more thoroughly in their belief. As an adjunct to previous knowledge to assist purchasers or breeders of cattle in getting or raising the best, and weeding out the poorest, they think it is worthy of being acquired by every farmer. And they would recommend their fellow farmers not to be dismayed at the apparent difficulties to be surmounted in obtaining a knowledge of the system, as it is only absolutely necessary to acquire a knowledge of the first four orders of each class, and a few other points, to practically apply it, as all animals below those grades are not worthy of being kept. Any intelligent man can readily master the system, and soon become proficient in it by practice. This knowledge, applied with the tests heretofore usually used, will enable any one to become a good judge of cattle.

The manner of making up their account of each animal is to examine the escutcheon and the udder, from which they place her in the class and order nearest to those delineated by Guénon, and then estimate the quantity, quality, and time that she will milk. These estimates must be, of course, only *approximate*, as they are based upon the indications of the escutcheon, the size of the cow, and her probable condition. As it is readily seen that where estimates are based upon what the cow should do *within three months of her being fresh*, it would be impossible to always grade the exact value of all the cows in a herd, each of which is at a different period of gestation, or in a different condition or state of health, and where also the cow is affected by the way in which she is fed and cared for, by the season, by the state of the temperature, and other circumstances. The estimates are based upon what the commission thinks the cow would do when all the conditions are favorable to her development, and where she is properly fed and cared for. A record is made by the commission on the spot. An account of the qualities of each head is drawn up by the owner. Each is made at separate times, and without the knowledge of the other party. Then the two accounts are copied off into parallel columns for comparison. If the accounts agree in seventy-five per cent. out of one hundred, it certainly must be presumed the system has sufficient value to make it worthy of adoption by all farmers and breeders. As every farmer knows the yield is much influenced by the feed, the care, the exposure, and the treatment of the cows; therefore, a certain amount of allowance must be made, for these various things will so alter matters, that no one can tell to a quart, or a pound of butter, or to the week in time of milking. In fact, every farmer knows neither the owner himself, nor his man, can tell to a quart how much his cow or cows actually give, unless a daily record is kept every day of every year. For even if he does keep such a record, he will find the various circumstances named above affecting the quantities in his record. Therefore the earnest seeker after truth, comparing the statements made in the two columns, must not expect the two to tally without some variations. The true spirit with which he must examine these statements, will suggest itself in the question: Is this a system by which I can judge of the value and quantities of a cow correctly? Is this a system that will tell me the points of a cow, good or bad, more correctly than by any other method? Let the candid inquirer weigh these statements, and think if he knows of any method by which he can go into a herd and surely pick out the best cows, and leave the poor ones to those who judge not by this system. Every farmer has his own mode of judging, but take the shrewdest and most practiced, can he avoid often the bastards? What the commission find they can do, is that in a large majority of the percentage of cases, they will give a good estimate of the qualities of any animal. Their opinions of the time a cow will go, is based upon what they think should be the treatment of all cows, viz.: that every cow should have a rest of from four to six weeks, at least.

The Commission at Barney's Farm.

The members of the Guenon commission, visited the farm of John B. Barney, on the 9th of May, 1878, and examined twelve cows, mostly Grade Durhams, Grade Jerseys, and farm stock, and they were uniformly successful in judging of said stock, with some difference of opinion on two of them.

> "I was present at the examination of twelve cows of my herd, and think the committee were so uniformly successful in judging of the merits of the different cows, with such slight variations of opinion between us, as to increase my belief in the Guénon system being of great advantage to the farmers in selecting stock.
>
> JOHN B. BARNEY.
>
> *Chadd's Ford, Chester county.*"

May 16, 1877.

The Commission at Sharpless' Farm.

The commission visited the fine farm and herd of Jersey cows of Samuel J. Sharpless, at Street Road station, West Chester railroad, May 10. Present. Messrs. Harvey, Blight, Hazard, and Thomas J. Edge.

SAM'L J. SHARPLESS' HERD OF JERSEYS, AS REPORTED BY E. J. DURNALL, HERDSMAN FOR S. J. S., May 10, 1878.	SAM'L J. SHARPLESS' HERD AS REPORTED UPON BY GUENON COMMISSION OF THE STATE, MAY 10, 1878.
No. 1.—Seven years. Quantity, about 12 quarts a day. Quality, medium. Milks about 10 months.	*No. 1.*—Curveline cow, second order. Quantity, if 14 quarts, doing well. Quality, good. Will milk ten months out of twelve.
No. 2.—Thirteen years. Quantity, best. Gives 24 quarts 3 months after calving. Quality, second rate. Has made 11¼ pounds in a week. Milks full up to time, except when she had twin calves.	*No. 2.*—Flanders cow, third order. Quantity, 16 quarts first three months. Quality, third rate. Dry two months.
No. 3.—Eleven years. Quantity, medium. Quality, best. Would go to her time.	*No. 3.*—Flanders cow, third order. Quantity, 12 quarts; three months. Quality, very good and rich. Dry six weeks.
No. 4.—Eight years. Quantity, medium. Quality, good; makes about 10 pounds. Up to her time.	*No. 4.*—Flanders cow, second order. Quantity, 14 quarts. Quality, very fine. Well up to her time.
No. 5.—Imported. Eleven years. Quantity, about 17 to 18 quarts a day. Quality, best; makes 11 pounds per week. Up to her time.	*No 5.*—Selvage cow, first order. Quantity, best; about 18 quarts. Quality, no question. Milks up to her time.
No. 6.—Ten years. Quantity, second rate. Quality, medium. About two months short of her time.	*No. 6.*—Flanders cow, first order. Superior milker. Quality, second class. Milks up to her time; say six weeks.
No. 7.—Two years old. Had only first calf. Quantity, medium. Quality, good. Not fairly tested for time.	*No. 7.*—Curveline cow, second order. Quantity, medium. Quality, too young for quality; say good. Time, too young for test.
No. 8.—Four years. Quantity, medium. Quality, first class. Up to calving.	*No. 8.*—Selvage cow, second order. Quantity, medium. Quality, good. Up to her time; say six weeks.
No. 9.—From Niobe Third. Three years. Quantity, first rate. Quality, first rate. Up to her time.	*No. 9.*—Flanders cow, second order. Quantity, first class. Quality, first class. Well up to her time.

No. 10.—Imported. Four years. Had first calf at Centennial, in October, and made in seven days, 9 pounds 10 ounces. Quantity, about 16 quarts. Quality, excellent. Up to time. Has been milking two years.	*No. 10.*—Decided to pass her.
No. 11.—Ten years. Quantity, second highest of herd; best. Quality, second class. Makes about 10 pounds. Full up to her time.	*No. 11.*—Horizontal cow. Quantity, first-class. Quality, inferior. Milk up to eight months.
No. 12.—Four years. Quantity, second rate. Quality, second rate; about 7 pounds. Milks to three months of her time.	*No. 12.*—Flanders cow, third order. Quantity, light. Quality, third class. Three months short of her time.
No. 13.—Six years. Quantity, number one. Quality, number one. Full up to time. At seven months from calf gives 16 quarts.	*No. 13.*—Flanders cow, number two order. Quantity, second class. Quality, first class. Up to her time.
No. 14.—Five years. Quantity, promises fair. Quality, good.	*No. 14.*—Flanders cow, first order. Quantity, good. Quality, fair. Within a month of her time.
No. 15.—Four years. Of Niobe stock, the poorest. Quantity, third rate; 6 quarts. Quality, good; second rate. Up to her time. Dropped her calf.	*No. 15.*—Flanders cow, second order. Quantity, about 12 quarts. Quality, not very fine.
No. 16.—Quantity, number one. Quality, number one. Up to her time.	*No. 16.*—Selvage cow, first order. First class every way.
No. 17.—First calf. Quantity, number one. Quality, number one.	*No. 17.*—Flanders cow, second order. Quantity and quality, fair.

The commission and Mr. Durnall agree as to the best cow, selected from the first six on this list—on the one side by the marks, and on the other from his knowledge.

"Having compared the annexed account of the qualities of the seventeen cows of my herd, examined by the State Guenon Commission, with the originals of the accounts as given by both parties at separate times, and taken down upon the spot, I believe it to be a true and faithful transcript of the original record of the examination.

SAMUEL J. SHARPLESS."

PHILADELPHIA, *May 20, 1878.*

"I was present at the examination of Mr. Sharpless' herd of Jerseys, made on the 10th of May by the State Guenon Commission, and having examined the accounts of the herd given by me, as hereto annexed, with the original entries of those given by me, and also the accounts of the commission, with the original written opinions, do certify that the annexed are faithful transcripts of the records made by each party at separate times, and that the statements were unknown to each other.

E. J. DURNALL,
Herdsman for Samuel J. Sharpless."

LENAPE FARM, *May 20, 1878.*

The Commission at Strode's Farm.

The members of the Guenon Commission visited the dairy farm of Marshall Strode & Son, who have a large butter factory, and are celebrated for their first-class butter, and they examined seventeen head of grade dairy stock, and according to the testimony of Mr. Strode, who accompanied them in their examination, were successful in judging according to the Guenon system, fifteen cows out of seventeen examined. Viewed May 10.

Present, Messrs. Harvey, Blight, Hazard, and Edge.

"Having been present when the members of the Guenon Commission examined seventeen of our herd, and having witnessed the accuracy with which they determined the quality of the stock inspected, we bear testimony to the fact that their judgment was correct, according to our experience with the cows, in fifteen cases out of seventeen, and even in these two they were partially successful. And we are more confirmed in our previous belief in the value of the system, as we never buy a cow for a good one that is not well marked. We run a dairy of seventy-one cows.

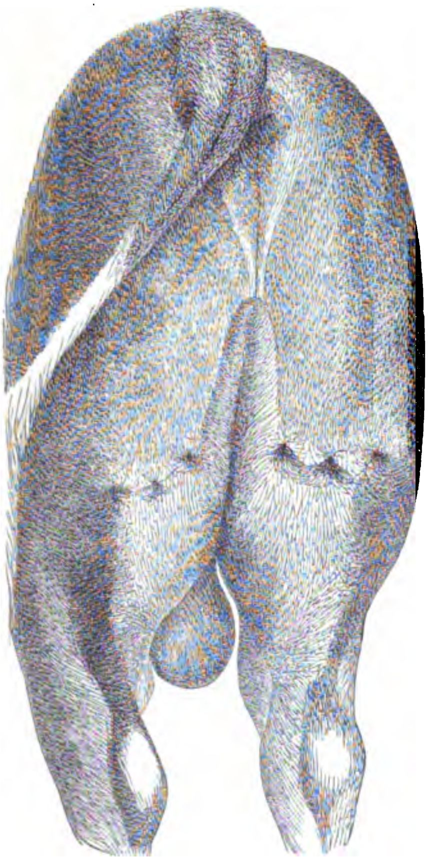
Yours truly,

MARSHALL STRODE & SONS."

EAST BRADFORD, *May 15, 1878.*

Examination of Thomas M. Harvey's Stock of Jerseys and Guernseys, May 11, 1878.*

This herd is one of the finest in the State. The cows are kept in good condition, and being well fed, the yield is very large per head. Their product is first class butter, and should bring the highest price in the market.



Escutcheon of Imported Guernsey Bull "Sir Champion."

The commission examined, in addition to the twenty-five cows on this list, Mr. Harvey's Guernsey imported bull "Sir Champion," which is thoroughly well marked; perhaps, the best marked bull in the country. The value of his get is, therefore, very decided. It shows most conclusively the importance of a bull from good milking stock, and that he should have a good escutcheon. The importance of a good sire to stamp his qualities upon his descendants was conclusively proved by Mr. Harvey's younger stock. The commission examined a young bull of seven months age, which was as perfectly and beautifully marked as his sire, and as nearly the same shape escutcheon as his sire's as could possibly be. Mr. Harvey has since sold him for $100, to Colonel R. M. Hoe.

Nos. 9½ and 9¾ prove also the gain to a herd from a well marked bull. These were yearlings of Champion's get. No. 9½ was a great improvement upon the mother, No. 9, Carrie, of this list.

In the statements of the commission as to quantity, they have not mentioned the number of quarts, as the amounts given by most of this herd are superior to the generality, even of Guernseys; and, owing to good selection and careful handling by their owner, the commission judge that the number of quarts would be larger than usual.

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* In this examination two cows which had already been examined and reported upon by the commission were, without their knowledge, afterwards brought up for another examination, in which their opinion as recorded, agreed almost exactly with the one previously recorded, thus affording a strong proof of the value of the system. See reports of No. 1, Betsy, and Nos. 4 and 20, Beauty. (Secretary of Board of Agriculture.)

STOCK OF THOMAS M. HARVEY. THOMAS M. HARVEY'S STATEMENT.

No. 1.—BETSEY.

Quality, medium.
Quantity, 17 quarts.
Never dry.

No. 2.—NANCY.

Quality, first rate.
Quantity, 16 quarts.
Will milk up to calving.

No. 3.—CLAUDE.

Quality, first rate.
Quantity, at first, 18 quarts; but at six months, 8 quarts.
Not inclined to go dry altogether.

No. 4.—BEAUTY.—(Worth.)

Quality, first rate.
Quantity, 20 quarts.
Almost impossible to dry off.

No. 5.—ZILLA.

Quality, medium.*
Quantity, 18 quarts.
Never dry.

No. 6.—CHERRY.

Quality, good.

Quantity, 24 quarts.
Will milk on.

No. 7.—ECHO.

Quality, medium.
Quantity, 20 quarts.
Does not go dry.

No. 8.—MINNA.—Guernsey.

Quality, first rate.
Quantity, 17 quarts.
Not inclined to dry.

No. 9.—CARRIE.

Quality, first rate.
Qantity, 10 quarts.
Will go dry two months.

No. 10.—GENTLE.—Jersey.
Quality, first rate.
Quantity, 20 quarts.
Dry two months.

No. 11.—MARY.—Grade, Durham.

Quality, medium.
Quantity, 18 quarts.
Dry two months.

No. 12.—EUGENIE.—Jersey.
Quality, medium.*
Quantity, 18 quarts.
Does not dry.

No. 13.—VICTORIA.—Guernsey.
Quality, medium.*
Quantity, 20 quarts.
No drying.

No. 14.—JENNIE.
Quality, good.
Quantity, 20 quarts.
One month dry.

STOCK OF THOMAS M. HARVEY. OPINION OF THE GUENON COMMISSION.

No. 1.—BETSEY.—Jersey. Curveline No. 1.
Quality, first rate.
Quantity, first rate.
Time of milking; up to her time.
Second examination confirmed.

No. 2.—NANCY.—Guernsey. Flander No. 2.
Quality, first rate.
Quantity, first rate.
Six weeks.

No. 3.—CLAUDE.—Guernsey. Curveline, 3d.
Quality, first-class for rich milk.
Quantity, not large.
Dry three months.

No. 4.—BEAUTY.—(Worth.) Curveline, 1st.
Quality, first class.
Quantity, large.
Close to time.
Rëexamined—See report No. 20.

No. 5.—ZILLA.—Guernsey grade.
Imperfect Selvage of low order. Irregularly marked.
Will milk well for few months only.
A good shaped cow.

No. 6.—CHERRY.—Half Jersey.
Good milk.
Milks profusely, and keeps herself thin on account of it.

No. 7.—ECHO.—Grade, Jersey. Selvage, 2d.
Quality, medium.
Quantity, medium.
Milks up pretty well.

No. 8.—MINNA.—Guernsey. Curveline, 2d.
Quality, good.
Quantity, good milker until within two months of calving.

No. 9.—CARRIE.—Strangely and imperfectly marked.
Quality, good.
Quantity, poor.
Dry up soon.

No. 10.—GENTLE.—Jersey. Selvage, 1.
Quality, first rate.
Quantity, large.
Dry six weeks.

No. 11.—MARY.—Grade, Durham. Flanders, 1.
Quality, first class.
Quantity, good.
Dry six weeks.

No. 12.—EUGENIE.—Jersey. Curveline, 2d.
Quality, first rate.
Quantity, large.
Dry two months.

No. 13.—VICTORIA.—Guernsey. Selvage.
Quality, medium.
Quantity, good while she milks.
Dry two months.

No. 14.—JENNIE. Ordinary stock.
Quality, not very rich, but good.
Quantity, good.
Dry two months.

No. 15.—MAGGIE, 2d—Young. Quality, medium.* Quantity, 10 quarts. Dry two months.	*No. 15.*—MAGGIE, 2d.—Guernsey. Flanders, 3d. Quality, very good. Quantity, medium and continuous. Dry two months.
No. 16.—ROCKET. Quality, medium. Quantity, 15, 20, to 25 quarts; variable. Dry three months.	*No. 16.*—ROCKET.—Grade, Jersey. Curveline, 2d. Quality, rich. Quantity, good. Dry two months.
No. 17.—AMY. Quality, good.* Quantity, 14 quarts. Ten weeks dry.	*No. 17.*—AMY.—Kentucky Short-Horn. Quality, medium. Quantity, poor. Dry three months.
No. 18.—COMLY. Quality, first rate. Quantity, 15 quarts. Dry two months.	*No. 18.*—COMLY.—Guernsey. Selvage, 3d. Quality, first rate. Quantity, good and continuous. Dry six weeks.
No. 19.—KITTY. Quality, first rate. Quantity, 16 quarts. Dry six weeks.	*No. 19.*—KITTY.—Guernsey and Jersey grades. Bicorn, 2d. Quality, first class. Quantity, first rate. Milks well up.
No. 20.—BEAUTY. Second examination. See No. 4.	*No. 20.*—BEAUTY.—Guernsey. Curveline, 1st. Quality, first class. Quantity, first class. Milks well up. This is the second examination. See No. 4.
No. 21.—ROSETTA.—Guernsey, imported. Quality, first rate.* Quantity, 18 quarts. Does not go dry.	*No. 21.*—ROSETTA.—Guernsey, imported. Flanders. Quality, excellent. Quantity, fair milker. Dry two months.
No. 22.—DUCHESS.—Guernsey. Quality, first rate. Quantity, 20 quarts. Don't go dry.	*No. 22.*—DUCHESS.—Guernsey, imported. Curveline, 2d. Quality, medium. Quantity, large. Dry two months.
No. 23.—BRIDGET.—Guernsey grade. Quality, first rate. Quantity, 14 to 18 quarts. Fails when pregnant. Does not dry altogether.	*No. 23.*—BRIDGET. Guernsey grade. Selvage, 4th. Quality, good. Quantity, poor. Dry three months or ten weeks.
No. 24.—FANCY.—Guernsey. Quality, medium. Quantity, 16 quarts, and fails fast. Dry three months.	*No. 24.*—FANCY.—Guernsey. Selvage. Quality, medium. Quantity, poor. Dry two months.
No. 25.—DAFFY.—Grade, Durham. Quality, medium. Quantity, 22 quarts. Does not dry.	*No. 25.*—DAFFY.—Grade, Durham. Flanders, 1st. Quality, good. Quantity, about 24 quarts. Milks her full time.

In the above account will be noticed a few with the mark * which Mr. Harvey said indicates that the amount of milk given and the quality was largely increased by extra feeding.

"I was present at the examination of our herd of Guernseys, Jerseys, and grades, by the Guenon Commission, on the eleventh of fifth month, 1878, and I have examined their report and compared it with the originals written on the spot, (the contents of which were before now unknown to me,) and I testify to the annexed report being an accurate copy of the opinions recorded by them at the time of examination. The statements made by me were handed to members of the commission on twenty-first instant, and are as nearly accurate as my own knowledge, and that of the persons who had the immediate care of the herd, and an interest in the proceeds of the dairy, could make them.

THOS. M. HARVEY."

WEST GROVE, *27th of 5th month, 1878.*

"Having had the immediate care of the herd of Thomas M. Harvey, and an interest in the proceeds of the dairy for six years, and being well acquainted with the merits of each member of the herd, I can certify that the statements we have made to the

Guenon Commission are correct to the best of our knowledge and belief, and were made more than a week after the commission had recorded their opinions; which opinions were unknown to us until the present time. I have also compared the record of opinions herewith with the originals, and find them to be a correct transcript of them.

CLARKSON MOORE."

"Having had the immediate care of the herd within alluded to, and an interest in the proceeds thereof for the past eleven months, I can certify that I united with Clarkson Moore in making the statement relative to the quality and productiveness of the cows examined by the Guénon commission. I was from home when they were here, and knew nothing of their opinions when we made up our statement.

ZEBEDEE HAINES."

Fifth month, 28th, 1878.

"I was present on Saturday, March 11, 1878, at the farm of Thomas M. Harvey, when the examination of that portion of his herd was made by the Guénon Commission, from Nos. 10 to 25, inclusive, of their report. I have compared the original recorded opinions of the commission with the report herewith, and find the latter correct.

N. J. SHARPLES,
President of the Experimental Farm Club."

Examination of William M. Large's Herd, Chestnut Grove, Doylestown, Bucks County.

The commission, as represented by George Blight and Willis P. Hazard, visited the beautiful farm of William M. Large, on the afternoon of May 31—on a very rainy, unpleasant day, and making the examination of stock a very difficult duty. The stock is a valuable one of thorough-bred and grade Short-Horns and is well fed and otherwise well cared for.

WM. M. LARGE'S ACCOUNT OF HIS HERD.	OPINIONS OF FHE STATE GUENON COMMISSION.
No. 1.—VICTORIA. Quantity, 18 quarts. Never tried her on butter but once, then made 10¾ pounds. Goes dry two months to ten weeks.	*No. 1.*—VICTORIA.—Short-Horn. Flanders, first order. Quantity, about eighteen quarts. Quality, good. Up to her time—say one month.
No. 2.—JOSEPHINE. The Doylestown Agricultural Society offered a premium of $25 for the cow that yielded the most butter; and also $25 for the cow that gave the most milk. The largest yield for a single week 16 pounds 3 ounces. Was tried five times during the year, two months apart; taking the average of the five consecutive trials, would make a trifle over 500 pounds. Awarded the first premium for butter, and second for milk. Lost the record of pounds of milk. Dry about one month.	*No. 2.*—JOSEPHINE.—Thorough-bred Short-Horn. Flanders, second order. Quantity, eighteen quarts. Quality, very good. About one month dry.
No. 3.—FANNY FERN. Quantity, nineteen quarts. Quality, never tried her butter production. Goes dry five or six weeks.	*No. 3.*—FANNY FERN.—Flanders, first order. Quantity, twenty quarts. Quality, first rate. About up to time, (one month.)
No. 4.—LETTIE. Quantity nine quarts. Quality, never tried her butter qualities, but her milk is rich and good. Goes dry about three months.	*No. 4.*—LETTIE.—Selvage, fifth order. Quantity, eight quarts. Quality, second rate. Dry four months.
No. 5.—NORAH. Quantity, fresh, gives seventeen quarts; holds to it well. Quality, has made 10 pounds butter in a week. Goes dry about two months.	*No. 5.*—NORAH.—Flanders, imperfect. Quantity, eighteen quarts. Quality, good. Dry three months.

No. 6.—LUCY.	*No. 6.*—LUCY.—Flanders, fourth.
Quantity, thirteen quarts.	Quantity, fourteen quarts.
Quality, a less number of pounds will make a pound of butter than most of my other cows; think her milk extra good.	Quality, good, very.
Dry some two months.	Dry three months.
No. 7.—BERNICE.	*No. 7.*—BERNICE.—Flanders, second.
Quantity, when fresh, about twelve quarts.	Quantity, twelve quarts.
Quality, never tried her butter production.	Quality, good.
Goes dry some three months, and has the credit of being the poorest cow in the herd.	Time, eight months out of twelve.
No. 8.—JOSEPHINE 2d.—First calf.	*No. 8.*—JOSEPHINE 2d.—Curveline, third.
Quantity, first calf, eleven quarts.	Quantity, ten to twelve quarts.
Quality, never weighed her milk or tried her butter production.	Quality, rich.
Cannot tell how long she will go dry.	Goes to two months of her time.
No. 9.—JUDITH.	*No. 9.*—JUDITH.—Flanders, first.
Quantity, seventeen quarts.	Quantity, eighteen quarts.
Quality, on a trial after her first calf was taken away, made 2 ounces less than 8 pounds of butter, done up in lumps for market.	Quality, good.
Goes dry six or seven weeks.	Well up to her time (one month or six weeks.)

"Having been present at the examination of my herd of Short-Horns, by the State Guenon Commission, May 31, 1878, I certify this report is a correct copy of the original records made on the spot, and at separate times; neither party having knowledge of the other's accounts.

WILLIAM M. LARGE."

CHESTNUT GROVE, *7th month, 3d, 1878.*

Report of the Examination of the Stock of Eastburn Reeder, of Rabbit Run Stock Farm, New Hope, Bucks County, Pa.

The commission visited the farm of Eastburn Reeder on Saturday, June 1, and examined his stock of Jersey and Guernsey breeds in presence of the proprietor and a number of members of the Solebury Farmers' Club. Mr. Reeder's account of his herd had been drawn up and placed in the hands of J. S. Williams, Esquire, secretary of the Solebury Farmers' Club, some ten days before the visit of the commission, and is printed herewith.

The commission was represented by George Blight and Willis P. Hazard, and part of the time by Captain J. C. Morris, of Susquehannna county, at the request of Thomas J. Edge, secretary of the State Board.

Mr. Reeder, not having made in his report any statements of the quality of the milk, except as regards the yield in butter, has sent the commission the following condensed statement of what each cow gave on May 20:

No. 1, Belle, ...	10 quarts.	No. 7, Florentia, ...	10 quarts.
No. 2, Topsy, ...	14 "	No. 8, Paunacussing, ...	8 "
No. 3, Firefly, ...	12 "	No. 9, Lady Delaware, ...	6 "
No. 4, Isabelle, ...	8 "		
No. 5, Marian, ...	14 "	Total for nine cows, ...	94 "
No. 6, Urania, ...	12 "		

Yield of the herd, May 20, . .	94 quarts.	Butter in seven days, ...	67 pounds.
Yield of the herd in seven days, ...	658 "	Quantity of milk to one pound of butter, ...	9$\frac{55}{67}$ qts.

This statement of the number of quarts required to make a pound of butter from Jersey and Guernsey stock, it will be seen, carries out the conclusions of the commission, who estimated the quality of this herd, as

well fed and not too long milked stock of these breeds should give a pound of butter to every nine quarts of milk.

"Having been present at the examination of my herd by the State Guenon Commission, on Saturday, June 1, 1878, and having since examined their report by the original record made on the spot by them, and compared it with my account of the herd, handed to Mr. J. S. Williams, May 21, or more than one week before they made the examination, I do certify that the accompanying report is correct and true.

EASTBURN REEDER,
New Hope, Bucks county, Pa."

RABBIT RUN FARM, *June 15, 1878.*

"I certify that Eastburn Reeder handed me his account of his herd ten days before the examination was made by the State Guenon Commission; that I was present with others at the examination; that the two reports were compared in the presence of a number, shortly after the examination, and were generally satisfactory; and that I have now examined the accompanying reports by the two original records, made at separate times as above mentioned, and have found them correct and true copies of said original records.

J. S. WILLIAMS,
Secretary of the Solebury Farmers' Club."

June 15, 1878.

Examination of Eastburn Reeder's Herd.

ACCOUNTS OF THE HERD BY EASTBURN REEDER.	OPINIONS OF THE HERD BY THE GUENON COMMISSION.
No. 1.—BELL.—Age, 12 years. Grade, Alderney. Calved November 10, 1877.	*No. 1.*—BELL.—Grade, Alderney. Flanders, 2d.
Greatest yield when fresh, 16 quarts per day. Yield May 20, 1878. 10 quarts per day. Butter, 8 pounds in seven days.	Quantity, 18 to 20 quarts.
Tried February, 1875.	Quality, fair.
Milks to one month of calving.	Dry three to four months.
No. 2.—TOPSY.—Age, 10 years. Guernsey. Calved March 9, 1878.	*No. 2.*—TOPSY.—Guernsey. Curveline, 2d.
Greatest yield when fresh, 18 quarts. Yield May 20, 1878, 14 quarts. Made 12 pounds in seven days.	Quantity, 16 to 18 quarts.
Tried June, 1872.	Quality, first rate.
Goes dry three months before calving.	Dry two months.
No. 3.—FIREFLY, (1133.)—Age, 8 years. Jersey. Calved October 28, 1877.	*No. 3.*—FIREFLY.—Jersey thorough-bred. Demijohn, 2d. Daughter of Niobe, 3d.
Greatest yield when fresh, 14 quarts. Yield May 20, 1878, 12 quarts. Averaged 6 pounds butter for forty weeks, from Sept. 1, 1872, to June 8, 1873. Greatest yield of butter in any one week since, 10½ pounds.	Quantity, 12 to 14 quarts.
	Quality, medium.
Never goes dry; has been milked regularly since August 27, 1872.	Dry two months.
No. 4.—ISABELLE, (1935.)—Age, 6 years. Jersey. Calved September 19, 1877.	*No. 4.*—ISABELLE.—Jersey thorough-bred. Flanders, 3d.
Greatest yield when fresh, 12 quarts. Yield May 20, 1878, 8 quarts. Made 9 pounds butter in seven days.	Quantity, 16 quarts.
Tried October, 1877.	Quality, first rate.
Milks to one month of calving.	Dry one month.
No. 5.—MARIAN.—Age, 6 years. Guernsey. Calved February 15, 1878.	*No. 5.*—MARIAN.—Guernsey. Curveline, 3d.
Greatest yield when fresh, 14 quarts. Yield May 20, 14 quarts.	Quantity, 16 quarts.
Butter never been tested.	Quality, first rate.
Milks to within one month of calving.	Dry two months to three months.
No. 6.—URANIA, (2793.)—Age, 5 years. Jersey. Calved January 30, 1878.	*No. 6.*—URANIA.—Jersey thorough-bred. Selvage, 2d.
Greatest yield when fresh, 12 quarts. Yield May 20, 12 quarts.	Quantity, 14 quarts.
Butter never been tested.	Quality, second rate.
Milks to one month of calving.	Dry one month.

No. 7.—FLORENTIA, (3518.)—Age, 4 years. Jersey. Calved January 1, 1878.	*No.* 7.—FLORENTIA.—Jersey thorough-bred. Curveline, 2d.
Greatest yield, 10 quarts. Yield May 20, 10 quarts.	Quantity, 12 quarts.
Butter never been tested.	Quality, second rate.
Milks to one month of calving.	Dry one month.
No. 8.—PAUNACUSSING, (5050.)—Age, 2 years. Jersey. Calved October 30, 1877.	*No.* 8.—PAUNACUSSING.—Jersey thorough-bred. Selvage, 2d.
Yield, May 21, 1878, 8 quarts.	Quantity, 12 quarts.
	Quality, medium.
Duration yet to be ascertained.	Dry two months, probably.
No. 9.—LADY DELAWARE, (5051.)—Age, 2 years. Thorough-bred Jersey. Calved January 3, 1878.	*No.* 9.—LADY DELAWARE.—Jersey thorough-bred. Flanders, 3d.
Yield May 21, 1878, 6 quarts.	Quantity, only milks out of two teats.
	Quality, medium.
Duration yet to be ascertained.	Dry three months, probably.

Examination of Moses Eastburn's Cow, Beauty.

ACCOUNT OF MOSES EASTBURN.	OPINIONS OF THE COMMISSION.
Cow, BEAUTY.—Age, 9 years. Calved March 20, 1878.	BEAUTY.—Jersey. Curveline, 2d.
Greatest yield of milk per day about 17 or 18 quarts. Yield May 24, 1878, 16 quarts. Duration of yield of milk, ten months.	Quantity, 18 quarts.
Quality of milk, 9 quarts to make a pound of butter. Butter made in eight and a half months, 302¼ pounds.	Quality, first class.
	Time, well up to her time.

"This is to certify that I was present at the examination of my cow, Beauty, this first of sixth month, 1878, by the committee to test the Guenon system, and find their report to correspond with the within statement.

MOSES EASTBURN."

SOLEBURY, BUCKS COUNTY.

Examination of Colonel James Young's Herd, at Middletown.

The Commission visited the large farms of Colonel James Young, near Middletown, and examined thirty-seven head of cows and heifers, among which were some of the finest Jersey cows in the State. His whole stock is well-fed and cared for, and are in fine condition. He supplies Middletown with the best of milk. Colonel Young does not keep a record of the performances of his cows, and the commision were therefore obliged to examine the cows, and after making their record, to compare it, item by item of each cow separately, with the knowledge of them had by his very intelligent dairy-woman, who has charge of the cows and the milk, and knows their characters as milk and butter producers well; also has a record of the times of calving of all the cows. The estimates of the commission agreed with hers, on all the hundred and eleven points, except nine points, and where they differed, that difference was in two cases on the quality, and in the other cases on the time. The commission attribute their unanimity on with this herd, to the careful selection and breeding of Colonel Young, to his good feeding, and the excellent care that the animals have. These points constantly looked after, maintain the excellence of the herd, and as a consequence the escutcheons correspond, for, as the colonel says, "he never saw a good escutcheon without being on a good animal, and never saw a good animal without a good escutcheon."

MIDDLETOWN, *November 1, 1878.*

"We were present when the commission visited our farms, and examined the stock, and we think they judged rightly of it, in nearly every case—we should say within five per cent. of being entirely correct.

We have examined the account to be printed with the original record, and find it to be correct and corresponding.

JAMES YOUNG,
JAMES S. YOUNG."

Examination of the Herd of William Calder, Esq., Harrisburg.

The commission visited one of the farms of William Calder, near Harrisburg. This gentleman has seven farms, containing nine hundred acres, and keeps a variety of stock. On the farm visited, near the reservoir, the commission examined eight head of grade stock, in very good order, on good September pasturage. The dairyman, a very intelligent man, had no record of the exact quantity and quality of the stock, but, as he milked them himself, a knowledge of their general qualities; and upon hearing the decision of the commission upon each cow, assented to the character given of all of them, except on two points: on one as to yield, and on another as to time. It was pleasing to notice the surprise and delight expressed by him at the exhibition, of entire strangers to the herd, of such accurate knowledge of them as the system showed it could give. And he determined to acquire it forthwith.

The commission saw a very fine black grade cow, with the calf by her side a perfect specimen of the Belted stock, though sired by a thoroughbred Jersey bull—to be accounted for only by the fact that the cow had been served by a Belted bull the third time before this one.

Examination of Several Herds near West Grove, Blanketed and Unblanketed, under the Supervision of a Committee of the Experimental Farm Club.

It had been stated by some that the commission used the ordinary means of judging of the value of cows, in addition to the Guenon tests. This was, of course, entirely denied by the commission; and as it was repeated in the public print, the commission, to settle the matter in the minds of candid men, offered to have any number of cows blanketed, so that only their posteriors could be seen, and then judge of their escutcheons, provided a committee should be present at the examination, view it closely, and give a report. Thus pressed, the challenge was accepted, and there was appointed a committee of five of some of the best farmers and dairymen residing near the Experimental farm. It was also understood that any could attend who wished to, and on the day of the examination three of the committee were present, as well as a number of other farmers. The commission examined the first five in the stable, blanketed, then two unblanketed, then two blanketed, and the remaining fourteen unblanketed. The report of this committee is appended herewith. The cows were examined on a farm of Thomas Gawthrop, near West Grove. Afterward a number of cows were examined on several farms in the neighborhood, in the presence of the committee. No longer time was required to form an opinion on the blanketed cows than on the others, and the comparative results can be judged from the accompanying tables.

The commission met them on the day appointed, at the farm of Thomas Gawthrop, and in the presence of the committee (three being present,) and of others, examined seven cows blanketed, and would have examined more, but the committee said it was useless, as they could see, and had full faith that only the escutcheon was considered by the commission. On this farm thirteen head were examined, and the results are herewith given. All then adjourned to the farms of Mark Hughes, Howard Preston, and Everard Conard, and examined other stock in the presence of the committee. The committee's report will be found annexed, thus setting to rest the charge that the commission were examining by any other than the Guenon test.

THOMAS GAWTHROP'S ACCOUNT OF COWS EXAMINED AT THOMAS GAWTHROP'S FARM, SEPTEMBER 20.	THE GUENON COMMISSION'S ACCOUNT OF COWS EXAMINED AT THOMAS GAWTHROP'S FARM, SEPTEMBER 20.
No. 1.—VICTORIA.— Grade, Jersey and Durham. Quantity, first. Quality, first. A first-class butter cow, and milks well up to time.	*No. 1.*—VICTORIA.*—Grade, Jersey and Durham. Eight years. Quantity, first. Quality, first. Up to her time.
No. 2.—CECIL.—Grade, Jersey. Quantity, first. Quality, first. First-class for butter. Milks up to time.	*No. 2.*—CECIL.* Quantity, first. Quality, first. Short eight weeks.
No. 3.—NELLIE. Quantity, second. Quality, second. Dry from ten to twelve weeks.	*No. 3.*—NELLIE.*—Demijohn, 1. Quantity, second. Quality, first. Short eight weeks.
No. 4.—LUCY.—Recently purchased. Yields three months from calving thirteen quarts. Quality, first.	*No. 4.*—LUCY.*—Flanders, 2d. Quantity, second. Quality, first. Up to her time.
No. 5.—LILY.—Grade, Jersey. Quantity, second. Quality, first. Milks up to time.	*No. 5.*—LILY.*—Grade, Jersey. Flanders, 2d. Quantity, second. Quality, first. Dry four to six weeks.
No. 6.—BEAUTY.—Jersey. Yields fourteen quarts per day. Quality, first. Milks to within eight weeks of calving.	*No. 6.*—BEAUTY.—Jersey. Five years old. Quantity, third. Quality, second. Dry two months.
No. 7.—DARBY.—Jersey. Quantity, fourteen quarts per day. Quality, first. Almost impossible to turn dry, though never excelling in quantity.	*No. 7.*—DARBY.—Jersey. Flanders, 2d. Quantity, second. Quality, first. Dry four weeks.
No. 8.—STAR.—Grade, three quarter Jersey. Yield with first calf from twelve to fourteen quarts per day, and milks well up to time. Quality, first class.	*No. 8.*—STAR †—Grade, three quarter Jersey. Flanders, 3d. Quantity, second. Quality, first. Dry six weeks. Her Jersey blood helps to overcome some blemishes on her escutcheon.
No. 9.—NORAH. Quantity, first, Quality, first. Dry from eight to ten weeks.	*No. 9.*—NORAH.†—Grade. Quantity, first. Quality, first. Up to her time.
No. 10. SALLIE.‡ Quantity, second. Quality, second. Goes dry eight weeks.	*No. 10.*—SALLIE.—Grade. Twelve years. Flanders, 2d. Quantity, 2d. Quality, second. Up to her time.
No. 11.—DIDO.‡—Grade. Quantity, twenty quarts. Second in quality. Dry from eight to twelve weeks.	*No. 11.*—DIDO.—Grade. Left Flanders. Quantity, first. Quality, second. Dry three months.
No. 12.—MOLLY.‡ Yields about sixteen quarts per day. Second-class quality. Dry from eight to twelve weeks.	*No. 12.*—MOLLY. Imperfect Flanders. Quantity, second. Quality, second, Dry ten weeks.
No. 13. WHITEFACE.‡ Second-class in quantity, fifteen quarts per day. Second quality. Dry about ten weeks.	*No. 13.*—WHITEFACE.—Grade. Curveline, 3d. Quantity, third. Quality, second. Dry ten weeks.

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* These five cows were so blanketed, as to show only the escutcheon.

† These cows were also blanketed.

‡ The last four animals were not blanketed, but were driven up and examined by the commission without any apparent reference to any marks, except the escutcheon. T. G.

MARK HUGHES' ACCOUNT OF HIS COWS, SEPTEMBER 20.	COMMISSIONS ACCOUNT OF MARK HUGHES' COWS.
No. 1.—LACTE. Do not know the quantity of milk and butter per week, but gives very rich milk, and milks up to calving.	*No. 1.*—LACTE.—Jersey thorough-bred. Flanders, second. Quantity and quality, first rate. Milks close to calving.
No. 2. LAURA. Quantity, twenty-four quarts milk per day. Quality, sixteen pounds butter week. Has never been dry; begins to increase in milk about three weeks before calving, and cannot be turned dry.	*No. 2.*—LAURA.—Jersey thorough-bred. Demijohn, 1st. Quantity, first rate. Quality, first class. Milks up to calving.
No. 3.—TOPSY. Quantity, twenty quarts milk per day. Quality, makes thirteen ponnds butter per week. Will milk up to calving.	*No. 3.*—TOPSY.—Grade, Jersey. Ten years. Curveline, 1st. Quantity and quality, first rate. Milks up to calving.

HOWARD PRESTON'S ACCOUNT OF HIS COWS.	GUENON COMMISSION'S ACCOUNT OF HOWARD PRESTON'S COWS, SEPTEMBER 20.
No. 1.—Grade Durham. Quantity, second. Quality, second. Milks up to her time.	*No. 1.*—Flanders, 2d.—Grade Durham. Quantity, second. Quality, second. Up to time.
No. 2.—Grade Durham. Quantity, second. Quality, second. Dry ten weeks.	*No. 2.*—Left Flanders.—Grade Durham. Quantity, second. Quality, second. Dry two months.
No. 3.—Common stock. Quantity, second. Quality, second. Dry eight to ten weeks.	*No. 3.*—Grade stock.—Imperfect Flanders. Quantity, third. Quality, second. Dry eight weeks.
No. 4.—Grade Durham. Quantity, third, Quality, second. Dry ten weeks.	*No. 4.*—Grade Durham.—Selvage, 2d. Quantity, second. Quality, second. Dry ten weeks.
No. 5.—Common stock. Quantity, second. Quality, second. Dry three months.	*No. 5.*—Native stock.—Flanders, 3d. Quantity, second. Quality, third. Dry three months.
No. 6.—Grade Durham. Quantity, second. Quality, second. Dry eight weeks.	*No. 6.*—Grade Durham.—Flanders, 3d. Quantity, third. Quality, third. Dry six to eight weeks.
No. 7.—Grade Durham. Quantity, second. Quality, third. Dry ten weeks.	*No. 7.*—Grade Durham.—Bicorn, 3d. Quantity third. Quality, second. Time, eight weeks.
No. 8.—NELLY.—Grade Jersey. Quantity, second. Quality, second. Dry eight weeks.	*No. 8.*—NELLY.—Grade Jersey.—Flandrine a Gauche. Quantity, second. Quality, second. Time, eight weeks.
No. 9.—JESSIE.—Grade Jersey. Quantity, second. Quality, second. Milks up to time.	*No. 9.*—JESSIE.—Grade Jersey.—Selvage. Quantity, second. Quality, first. Up to time.
No. 10.—POLLY.—Grade Jersey. Quantity, first. Quality, first. Milks up to her time.	*No. 10.*—POLLY.—Grade Jersey.—Flanders, 2d. Quantity, second. Quality, second. Up to time.
No. 11.—LILY.—Common stock. Quantity, first. Quality, first. Dry eight weeks.	*No. 11.*—LILY.—Native stock.—Flanders, 2d. Quantity, first. Quality, first. Dry four to six weeks.

No. 12.—Blush.—Grade Jersey. Quantity, first. Quality, first. Dry six weeks.	*No. 12.*—Blush.—Grade Jersey. Curveline, 2d. Quantity, second. Quantity, second. Dry six weeks.
No. 13.—Topsy.—Grade Jersey. Quantity, second. Quality, second. Dry three months.	*No. 13.*—Topsy.—Imperfect Curveline.—Grade Jersey. Quantity, third. Quality, second. Dry three months.
No. 14.—Bonnie.—Common stock. Quantity, first. Quality, first. Milks up to her time.	*No. 14.*—Bonnie.—Flanders, 1st.—Native stock. Quantity, first. Quality, second. Up to her time.
No. 15.—Daisy.—Common stock. Quantity, third. Quality, second. Dry three months or more.	*No. 15.*—Daisy.—Flanders, 3d.—Native stock. Quantity, third. Quality, second. Dry six weeks.
No. 16.—Katie.—Common stock. Quantity, third. Quality, second. Dry six weeks.	*No. 16.*—Katie.—Flanders, 2d.—Native stock. Quantity, second. Quality, second. Dry four to six weeks.

Joseph Pyle's Statement of his Cows:	Guenon Commission's Account of Joseph Pyle's Cows:
No. 1.—Fawn. Quantity, 10 to 15 quarts. Quality, very rich milk. Dry from four to six weeks.	*No. 1.*—Red Grade Cow—8 years.—Flanders, 2. Quantity, 14 or 15 quarts. Quality, second. Dry about ten weeks.
No. 2.—Fancy. . Quantity, 16 to 18 quarts. Quality, milk very good quality. Falls off sooner than most cows, and will go dry eight weeks.	*No. 2.*—Fancy.—Guernsey. Flanders, 3. Quantity, 18 quarts when fresh, and will begin to reduce and stop two months short of her time. Quality, first. Will go two months dry.

This cow had been previously examined, May 11, at Thos. M. Harvey's farm. Mr. Harvey had since sold her to Mr. Pyle. The following are the two statements at that time:

T. M. Harvey:	Guenon Commission:
Quality, medium.	Quality, medium.
Quantity, 16 quarts and fails fast.	Quantity, poor.
Dry three months.	Dry two months.

Commission's Account of Milton E. Conard's Cows:

No. 1.—Lily.—Grade, Guernsey. Bicorn, 1.
Quantity, about 20 quarts.
Quality, first.
Milks up to her time.

No. 2.—Floyd.—Flanders, 1.
Quantity, 18 quarts.
Quality, very good.
Milks up to her time.

This is a very correct description of my cows, Lily and Floyd.

M. E. Conard.

The above examination of our herds of cows, some of which were covered by a large blanket, completely excluding from view every part of the animal except the escutcheon and back part of udder, subjected the commission to the severest test that could be applied; and agreeing, as their estimate of quality and quantity does, with our previously written reports, leads us to think that in the hands of experts it would be a valuable aid in judging the quality of dairy stock.

Thomas Gawthrop,
Everard Conard,
Howard Preston,
Mark Hughes,
Committee.

West Grove, *11 month 7, 1878.*

The undersigned having been present at the examination of Thomas Gawthrop's herd of dairy cows, by the Guenon commission, on the 2d day of 9 month, 1878, am free to say that, although most of the cows were blanketed from horns to tail, their estimate, in a great majority of them, very nearly corresponded with the owners account previously prepared.

M. E. Conard.

West Grove, Pa., *11 month 7, 1878.*

Joseph Pyle would have signed had he been present at the examination. Expresses confidence in the system.

T. G.

Examination of J. & J. Darlington's Cows, October 2d.

The commission visited the herds of Messrs. J. & J. Darlington, October 2, at Darlington station, on Westchester road, Delaware county. These gentlemen make the finest butter and get the largest price in the market. Their dairy is admirably arranged. They have farms of four hundred and eighty acres, and have a herd of one hundred and sixty-seven cows. They had selected about a fair sample of the herd in two lots of cows. The first lot, from No. 9 to 33, was on one farm, and those numbered from 1 to 14 on the other farm. These gentlemen kept no test of the quality of any cow's milk, and have no exact record of the quantity given by any cow; but as they are experienced dairymen, and thoroughly practical men, they knew about what each cow was giving in milk, and about its general quality, and sufficient to pronounce the grade of each cow, whether first, second, or third class. Therefore, in their record they do not give the exact record, as the committee would have desired, so as to compare with their own estimates, but they give the general qualities of the cow, and the two records must be compared from that stand point. Another matter must be taken into consideration. The Messrs. Darlington are liberal feeders, which accounts partly for their rich, tasty butter, and tends to make their cows do full work, A standard of quarts for first, second, and third class, upon which to estimate the qualities of the cows, was agreed upon between the commission and Messrs. Darlington.

J. & J. Darlington's Account.	Guenon Commission's Account.
No 9.— Quantity, first. Time, six to eight weeks. First-class cow.	*No. 9.*—Grade Durham.—Bicorn, second. Quantity, second. Quality, second. Time, four to six weeks.
No 61.— Quantity, second. Time, six to eight weeks. Second class cow.	*No. 61.*—Grade Durham.—Imperfect Flanders, third. Quantity, second class. Quality, second class. Time, two months.
No. 4.— Quantity, third. Time, four to six weeks. Third class cow.	*No. 4.*—Grade Durham.—Flanders, third. Quantity, third. Quality, second. Dry one month.
No. 1.— Quantity, first. Time, four to six weeks. First-class cow.	*No. 1.*—Grade Durham.—Flanders, sec'd. Quantity, second. Quality, second. Up to her time.
No. 41.— Quantity, first. Time, four to six weeks. First-class cow.	*No. 41.*—Grade Durham.—Flanders. Quantity, first. Quality, second. Time, six weeks to two months.
No. 22.— Quantity, first. Time, four to six weeks. First-class cow.	*No. 22.*—Grade Durham.—Flanders, 2d. Quantity, first. Quality, first. Up to time, say four to six weeks.

No. 6.— Quantity, third. Time, six to eight weeks. Third class cow.	*No. 6.*—Grade Durham.—Imperfect Flanders. Quantity, third. Quality, second. Dry eight to ten weeks.
No. 7.— Quantity, second. Time, eight to ten weeks. Second class cow.	*No. 7.*—Grade.—Flanders, with bastard marks. Quantity, second. Quality, second. Up to her time, six weeks. Reëxamined, and shows bastard marks.
No. 67.— Quantity, first. Time, four to six weeks. First-class cow.	*No. 67.*—Grade Durham.—Imperfect Flanders. Quantity, first. Quality, second. Dry eight weeks.
No. 19.— Quantity, third. Time, two to three weeks. Third class cow.	*No. 19.*—Grade.—Selvage, third. Quantity, third. Quality, second. Dry eight weeks.
No. 32.— Quantity, third. Time, two to three weeks. Third class cow.	*No. 32.*—Durham.—Flanders, third, partly bastard. Quantity, second. Quality, second. Dry eight weeks.
No. 1.— Agrees with the commission. Second class cow. Dry about two months.	*No. 1.*—Grade.—Flanders, third. Quantity, second. Quality, second. Dry two months.
No. 2.— Agrees with commission. First-class cow. Dry four to six weeks.	*No. 2.*—Grade.—Flanders, second. Quantity, first. Quality, first. Dry four to six weeks.
No. 3.— Second class cow. Dry about six weeks.	*No. 3.*—Grade.—Imperfect Flanders. Quantity, first. Quality, first. Dry six weeks.
No. 4.— Agrees with committee. Second class cow. Large milker, but fails too soon. Dry from six to eight weeks.	*No. 4.*—Grade.—Flanders, second. Quantity, second. Quality, second. Dry six to eight weeks.
No. 5.— Large milker. First-class. Dry six to eight weeks.	*No. 5.*—Grade, Durham. Quantity, second. Quality, second. Dry eight to ten weeks.
No. 6.— Agrees with committee. Second class. Dry three to four weeks.	*No. 6.*—Grade.—Horizontal, first. Quantity, second. Quality, second. Dry four to six weeks.
No. 7.— First-class in every respect. Best in the herd. Dry four to eight weeks.	*No. 7.*—Grade.—Curveline, second. Quantity, second. Quality, third. Dry four to six weeks.
No. 8.— Agrees with committee. Good second class. Dry four to six weeks.	*No. 8.*—Grade, Durham.—Horizontal, first. Quantity, second. Quality, second. Dry four to six weeks.
No. 9.— First-class. Dry four to six weeks.	*No. 9.*—Grade.—Flanders, a Gauche. Quantity, second. Quality, second. Dry six weeks.
No. 10.— Agrees with commission's. Second class. Dry six to eight weeks.	*No. 10.*—Grade.—Flanders, second. Quantity, second. Quality, second. Dry six weeks.
No. 11.— First-class. Dry about eight weeks.	*No. 11.*—Grade.—Double selvage.—Some bastard marks. Quantity, second. Quality, second. Dry ten to twelve weeks.

No. 12.— Agrees with commission's. First-class. Dry six to eight weeks.	*No. 12.*—Grade.—Imperfect Flanders. Quantity, first. Quality, second. Dry six weeks.
No. 13.— Agrees with commission. Third class. Dry four to six weeks.	*No. 13.*—Grade, Durham.—Flanders, third. Quantity, third. Quality, third. Dry six to eight weeks.
No. 14.— Agrees with commission. First-class. Dry two to three weeks.	*No. 14.*—Grade.—Flanders, second. Quantity, first. Quality, second. Up to her time.

We were present at the examination of our stock by the Pennsylvania Guenon Commission, on October 2d, and have examined the accounts here rendered, with the original written opinions, and find them to correspond. The accounts were given by both parties without either knowing anything of the accounts of the other.

(Signed) J. & J. Darlington.

Having given the results of their work, the commission would now leave the further solution of the problem to the practical dairymen of the State. They, of course, expect that not only their report, but also the correctness of the system, will be criticised; but if this criticism is conducted with a spirit of fairness, and with a view to obtain the truth, they fully believe the result will be favorable.

By direction of the commission.

WILLIS P. HAZARD,
Secretary.

THE GUENON SYSTEM OF JUDGING OF THE VALUE OF CATTLE.

By Willis P. Hazard, *Secretary of the Pennsylvania State Guenon Commission.*

The commission, appointed by the Governor of the State to make tests of the value of the system of Guenon, has awakened so much interest that I have been desired to explain the system, so that it might be practically tested by the fifteen thousand agriculturists into whose hands this volume will fall. I have done so as a private individual, and am alone responsible for the statements made. I could have wished to have had printed all that was thought necessary to fully explain the system, and give a history of it, but the limits forbid, and it will appear in the future, in some other form.

Guenon discovered his system while acting as cowherd, and devoted many years to perfecting it. It consists of certain marks on the posteriors of the bovine race, formed by the uprunning hair in contrast with the downrunning.

Mr. Guenon has told us his attention was first called to the fact of a difference in the outward marks on cows by the dandruff, then by the quirls, and, on closer study, a variety in the shapes of what he has called escutcheons. He soon found that among the great variety of shapes of the escutcheon, they could be reduced to a classification; that is to say, there were eight general shapes, around which subdivisions or variations of those shapes could be arranged in orders. He therefore arranged cows, by his system of marks and shapes, into *eight* CLASSES, or families, and each of these classes into eight ORDERS. This is the only part of his classificaton that it is necessary for us to know, though in each class he made distinctions according to the size of the animal, high, low, and medium. Now, if we have eight classes, and eight orders of each class, and three sizes to each, we have one hundred and ninety-two distinctions to learn, to which he added eight exceptions, or one to each class, and which he called "Bastarde,"—spurious, or bastard cows, and this made the number of specifications to learn two hundred. And as Guenon, with the scrupulous care of an enthusiast, recorded the quantity of milk each of these two hundred divisions would give, and the length of time they would give milk after becoming with calf, and ranged from twenty-four quarts a day to almost none, and from milking plump up to the next calving, to not milking any after becoming with calf, it became discouraging to learn so many points; the intricacies of the system frightened so many, that but few pursued the study to a full understanding of it.

This classification embraced all the kinds of cows known to Guenon; each individual escutcheon corresponding with one of the orders of those classes. The *class*, the *order*, and the *size* of an animal indicate her yield of milk, and this will always be found to correspond with her escutcheon. Every cow has an escutcheon, which can be recognized, and, according as it is free from imperfection or blemish, just in that degree does she approach perfection in her class.

Guenon, in the last edition of his work, has altered and simplified his classification somewhat, for he divided it into *ten* CLASSES, and *six* ORDERS to each class. He maintains his three grades of size. But our experience shows that the cows in this country do not vary so much in size, as they probably do in France, for there they have the little Brittany cow, which is very small but good, and, of course, they have also cows as large as our Durhams or the Holsteins. Only this bear in mind, that cows, as a general rule, all other things being equal, will vary in their yield somewhat according to their size, and in judging cows apply that rule, for it is part of Guenon's system. Well, then, for practical purposes, we need only study sixty *escutcheons*, that is ten different shapes, called *classes*, and six grades to each of those shapes, more or less perfect, which are called *orders*. To these must be added ten more for a *bastard* to each class. And it is really necessary to study perfectly only the first four orders of each class, and the bastard marks, as it is not worth while to purchase or pay much attention to any cows lower in the scale than the fourth order order of any class.

The Escutcheon.

Chalkly Harvey, a member of the Pennsylvania commission, says:

"Now this may seem somewhat discouraging to your readers, but with all due respect to Guenon, to whom all honor and praise should be accorded for his brilliant discovery, I think that it may be so simplified that every farmer, dairyman, and dealer can learn it all in a short time, and may find the study quite interesting. I began it laboriously, supposing that a mastery of all the details was necessary to make it of any use, but more than twenty years of constant application in practice has simplified it to my mind, and has added a little, I think, to the original discovery. The substance of Guenon's discovery is that the milking qualities of any cow, of any breed, are indicated by an outward sign that all may see and easily understand. The hair on a cow, as on other animals, grows downward on the hind-quarters, but there is an exception to this rule on the back part of the udder, where it usually grows upward. The first lesson for a beginner is to notice this fact. Let him stand behind a quiet cow, and rub the hair on the udder both ways until he sees or feels just what I mean. Guenon called the surface that is covered by this upward growth the escutcheon; others have called it the milk-mirror; but this is no improvement in any respect, and I shall name it as Guenon did, for there is no real objection to that name, and there is serious objection to making confusion by calling the same thing by different names. The escutcheon, then, is that surface on the cow's udder where the hair grows upward. But it is not confined to the udder, it extends upward above the udder, often to the vulva, and outward upon the thighs on both sides of the udder. (See Flanders cow, class first, order first.) These escutcheons are different in size, in shape, and in quality, (quality means the quality of the skin, and of the hair growing on it,) and these differences indicate the different milking qualities of the cows, including quantity and quality of milk, and the length of time they will give milk after being with calf. On the edges of the escutcheon where the upward and the downward growths of hair meet, a feather is formed, and this is most conspicuous on the back part of the thighs where escutcheons extend that wide. If the hair is long, as it generally is in winter time, the observer can define the limits of the escutcheon better by applying his hand, and smoothing the hair to its natural place. He will now perceive that the hair on the escutcheon is shorter and softer than elsewhere, as well as turned upward in its growth, and sometimes nearly resembles fur.

The escutcheon was so called, we presume, from its similarity to the shape of a shield or escutcheon, and on a first class cow it will be very like it, and somewhat like a round-pointed shovel. On this escutcheon the hair will generally be of a different color from that bordering it, most generally rather darker, always shorter and more nearly resembling fur. This difference in color is produced by the the UP-growing hair contrasting with the DOWN-growing surrounding it. The hair of the escutcheon should be short, soft, and fine; and the skin very soft, like a kid-glove, thin, and oleaginous. And if the cow gives good rich milk, this skin will be of a rich golden hue. Often where you handle a skin of this character, the hands will feel oily, and soiled with the rich dandruff.

The Shape of the Escutcheon.

The escutcheon varies in shape, and Guenon named his ten classes from their shapes.

The first class he called Flandrine or Flanders, because it is the best, and he named it from the best cow he knew, those from Flanders or the Flemish breed, and they had more of this shaped escutcheon than any other breed; a quiet but sure proof of the truth of his system.

The second class he called Flandrine à Gauche, because although it had the Flanders shape, it was on the *left* flank. He called it, therefore, the Left Flanders.

The third class are the Lisière or the Selvage, from its appearance to a selvage or binding of a piece of cloth.

The fourth class are the Courbe-Ligne or the Curveline, because their escutcheon is lozenge shaped, formed by a curved line, which sides to the right and left, and rises to about five or six centimetres from the vulva.

The fifth class he denominated Bicorn or the Bicorn cow, because the upper part of this escutcheon forks in two horns.

The sixth class, Double-Lisière or Double Selvage, has an entirely arbitrary name, as it is an odd freak of nature.

The seventh class are called Poitevine or Demijohn, from a fancied resemblance to some kinds of demijohns.

The eighth class is Equerrine or Square escutcheon, as it is square at the upward part.

The ninth class is the Limousine, as it was on a cow from that province that Guenon first saw this shaped escutcheon.

The tenth class is called Carrésine or Horizontal, because the upper part of the escutcheon is cut off squarely by a horizontal line.

To each of the above ten CLASSES, Guenon has placed six ORDERS, which are variations of the escutcheon, formed by a reduced size and by various imperfections. If the reader will remember always, that the first class is better than the second class, and the second class better than the third class, and so on down the scale to the end of the classes, he will have gained the first step in acquiring the system. Then the next point to remember is similar, that is, that the first *order* of every *class* is better than the second order of that class, and so on down the scale of the orders, until the sixth. Then he must learn the different shapes; first the characteristic shape of each class, as represented by the first order of that class, and connect with this, in his mind, the number of quarts a first-class cow, in good feed and condition, should give, as represented by that escutcheon, in her full flow of milk. Then he can next learn the variations in size and shape from this pattern escutcheon, and that will enable him to tell which order of her class to put her in, and that will then inform him what quantity of milk she will give, and how long she will give it when with calf. And we repeat here, it is necessary only to acquire the knowledge of the first four orders of each of the ten classes, as if the cow examined does not come within those orders, she is not worth examining further, nor keeping longer, nor certainly worth purchasing. Then the learner must next acquire a knowledge of the distinguishing marks which point out a bastard cow, for an account of which marks see under that head.

Now all this knowledge must, to put it into profit practically, be supplement by the careful examination of the hair, and the skin of the escutcheon, and the udder. Of the hair, whether it is short, fine, soft, and furry; of the skin, whether it is soft and close-grained like a kid glove, thin, oleaginous, and yellow or golden. For if the hair is harsh, and long, particularly on the back part of the udder, it will shorten the time of giving milk, and indicates a poorer quality. The more oily or greasy to the feeling the skin of the udder and perinæum is, the more it indicates good quality and richness of milk, for the oil or fat is there, showing it is in the nature of that animal to give butyraceous milk. So with the color of the skin, if it is golden it is indicative of rich milk, and the majority think it will make a finer colored butter. There is one point more in judging by the escutcheon, and that is its size and position, and the general rule is, the higher up it is on the thighs, and the broader it is on the thighs, together with the higher and broader it is on the perinæum, even up to the vulva, then the better it is. Then remember the escutcheon has two principal parts, called the thigh escutcheon and the vertical escutcheon; the thigh escutcheon extends over the udder and the thighs; and the vertical is over the perinæum or that part of the posterior which extends from the udder up to the tail and about the vulva. If the thigh escutcheon is high and broad, therefore, very large, and extends far outward on to the thighs, it indicates a large flow of milk. If the vertical or upper part is broad and smooth, it indicates a prolonged flow of milk.

If the thigh or lower portion of the escutcheon is narrow, the flow will be proportionally small; if the vertical or upper part is narrow and irregular, it is unfavorable to a prolonged flow.

We will now add what Mr. Harvey has written about the above:

> "Let us now particularly consider the shapes and sizes of these escutcheons. There is one general shape to which they conform, and that is that they are wider below than above, and at or near the top of the udder they narrow in abruptly; some continue up as far as the vulva, and even above it, and others but a little distance above the udder, (see the figures.) The size and shape of this upper part of the escutcheon is of less importance than that of the lower part, but both must be considered—the larger the escutcheon the better. All great milkers have very large escutcheons. In large ones the upturned growth often begins on the belly, in front of the udder, extends along between the teats and up the back part of the udder, over the whole width. Indeed, the udder is not wide enough for it, and it encroaches on the thighs, where we may find the hair having an upward growth on them, inside next the udder, beginning not far above the hock joints, and running up as high as the wide part of the escutcheon extends up the thighs, and which often terminates with corresponding curls in the hair at the outlines, and the higher up and wider these are apart the better. Though the extension of the escutcheon to the front part of the udder on the belly has mentioned, that is not a matter of practical interest in ordinary cases. All that n to be studied is plain to be seen by standing behind the cow. When the escutche

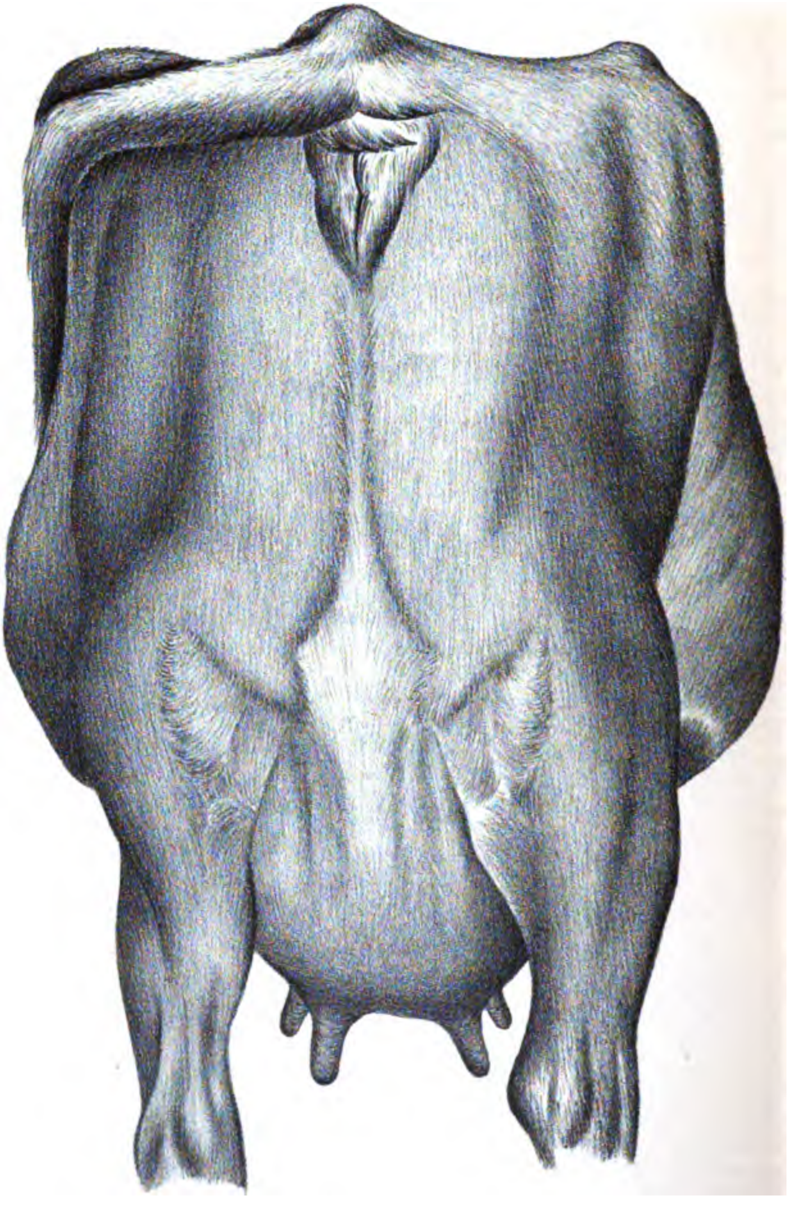


PLATE SHOWING THE ESCUTCHEON AND THIGH-OVALS
OF A THOROUGH BRED JERSEY COW.
OWNED BY WILLIS P. HAZARD, WEST CHESTER, PA.

4. *Epi vulvé*, vulvan tuft. This is also a deteriorating sign; is a tuft of descending hair directly under the vulva, as in class one, orders three and four.

5. *Epi batard*, perinæal tuft. This is always a bad mark, as it exists on otherwise good marked cows, and indicates a diminution of milk, as soon as the cow becomes pregnant. It is seen on class one, bastard. A cow is to be looked upon with suspicion that has this mark largely developed.

6. *Epi cuissard*, thigh tufts. These are diminutions of the escutcheon by encroachment of descending hair, and denote a diminishing of the quantity of milk, proportionate to their extent. See class one and two, order four.

7. *Epi jonctif*, mesian tuft. The mesian or dart-like tuft, with soft silky ascending hair, is rarely seen, and only in those classes in which the escutcheon does not ascend to the vulva. It is like a V hanging beneath the vulva, and is not fully represented in the plates, though class ten, order two, shows it somewhat."

In these observations among cows, not only during their work as members of the commission, but also in preceeding examinations, Messrs. Blight, Harvey, and Hazard noticed a series of marks, which they have denominated *thigh ovals*. The plate showing the escutcheon of Mr. Hazard's Jersey cow furnishes one of the best illustration of these marks yet met with by the commission. Where the vertical escutcheon joins and widens out into the thigh escutcheon, there is usually a dip of a curved shape more or less in extent. In the plate above alluded to these thigh ovals descend nearly to the base of the udder. In their careful examination of more than two hundred cows, the commission always found these marks good only on cows.

In his examinations Guenon found cows of apparently each class with certain variations in their markings which distinguished them and prevented their incorporation into any class, and, yet the similarity gives them a claim in their particular class. In all cases he claims to have noted that cows thus marked would milk as well as other members of their class, until they were got with calf, but as soon as this was accomplished, the quantity of milk fell off rapidly. The commission claim it is this style of marking which is most likely to deceive the superficial or amateur investigators, and that these have caused the assertion that a poor cow may be well marked, when in reality, if properly understood, she was *not* well well marked. This class of cows Guenon styled *Bastards*, and he preatically assigned to them a distinctive or seventh *order* in each class.

In 1822, Guenon seems to have first reduced his system to a classified basis, and from that time until 1828 he appears to have given it much of his time and attention. Having, as he deemed, sufficiently arranged and tested his system, he, in 1828, applied to the academy of Bordeaux for a public test of the correctness of his mode of judging of cows and their milking value.

The following, from the proceedings of the academy, shows that Guenon did not make his system common property. The minutes of the academy, under date of June 3, 1828, contains the following record: "Mr. Francis Guenon, of Libourne, possessor of a method which he deems infallible for judging, by mere visual examination, of the goodness of milch cows, and the quantity of milk which each can yield, has solicited the Academy to cause the efficaciousness of this method to be tested by repeated experiments. The case presented by this request was one of a secret method of judging, which the possessor was not willing to reveal. On the other hand, it seemed difficult to admit that the external sign, whatever it might be, by which Mr. Guenon judges, could always bear a proportional relation to the quantity of milk yielded by a cow. Nevertheless, the academy deemed it proper to appoint a committee charged with making the examination. Trials have been made with care, and under precautions necessary for precluding all collusion. The cows used for the purpose belonged to three different herds, and amounted to thirty in number, and the result has been to establish, to the satisfaction of the committee, that Mr. Guenon really possesses great sagacity in this line. So long, however, as his method shall be kept secret, it cannot be judged of, nor rewarded by, the academy. Governed by these considerations, the academy, having ascertained from Mr. Guenon that he is willing to submit to every test that may be proposed, and to disclose his secret, upon receiving a just indemnity, has referred him to the prefect, and has engaged to recommend him to the favorable notice of that magistrate, who is ever disposed to promote all that tends to improve it."

From 1822 to 1827, it would seem that Guenon perfected and studied his system, but it does not seem to have come promptly before the public, until the agricultural society of Bordeaux took upon itself a careful investigation of the whole system. From the detailed report of this committee, appointed by this society to test the knowledge of Guenon, we take the following as illustrating, not only the results reached by them, but also the manner of conducting the examination:

> "Every cow subjected to examination was separated from the rest. What Mr. Guenon had to say in regard to her was taken down in writing by one of the committee; and immediately after, the proprietor, who had kept at a distance, was interrogated, and such questions put to him as would tend to confirm or disprove the judgment pronounced by Mr. Guenon. In this way we have examined, in a most careful manner—note being taken of every fact and every observation made by any one present—upward of sixty cows and heifers, and we are bound to declare that every statement made by Mr. Guenon, with respect to each of them, whether it regarded the quantity of milk, or the time during which the cow continued to give milk after being got with calf, or finally, the quality of the milk as being more or less creamy or serous, were confirmed, and its accuracy established. The only discrepancies which occurred, were some slight differences in regard to the *quantity* of milk, but these we afterward fully satisfied ourselves were caused entirely by the food of the animal being more or less abundant.
>
> "The result of this first test seems conclusive, but they acquire new force from those of a second trial in which the method was subjected to another test through M. Guenon and his brother. Your committee, availing themselves of the presence of the latter, caused the same cows to be examined by the two brothers, but separately, so that after a cow had been inspected, and her qualities as indicated by the signs in question had been pronounced upon by one of the brothers, he was made to withdraw; then the other brother, who had been kept aloof, was called up, and desired to state the qualities of the same animal. This mode of proceeding could not fail to give rise to difference, to contradiction even, between the judgments of the two brothers, unless their method was a positive and sure one. Well, gentlemen, we must say it, this last test was absolutely decisive. Not only did the judgment of the two brothers accord perfectly together, but they were in perfect accordance also with all that was said by the proprietors in regard to the qualities, good or bad, of every animal subject to this examination."

On the 26th of May, 1837, a similar test was made by the agricultural society of Aurillac, whose committee, in their report, use the following language:

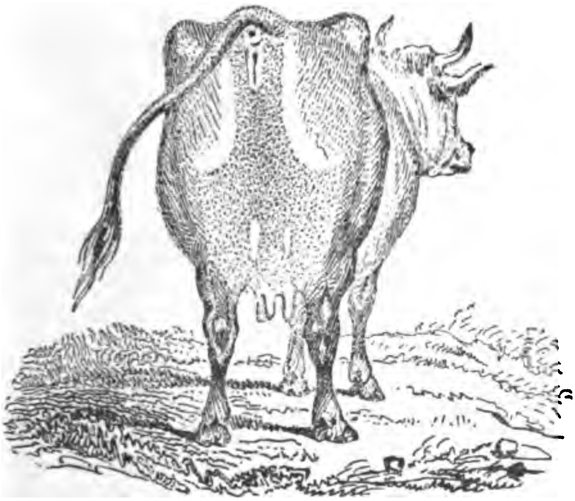
> "Each cow was examined separately by M. Guenon, who wrote his notes upon her, and delivered the paper closed to one of us. Immediately after, another member of the committee questioned the owner of the cow, or the person in charge of her, in regard to her daily yield of milk, its quality, and the time during which she continued to give milk after being got with calf. The answers were taken down in writing, and then compared with the notes written by M. Guenon. They were generally found to accord, and proved to the satisfaction of your committee and of every one present, all of whom attended with lively interest to these proceedings, that M. Guenon possesses great sagacity in judging of cattle, and that his method rests upon a sure foundation."

DESCRIPTION OF THE CLASSES AND ORDERS.

Prepared by W. P. HAZARD, *Secretary of the Pennsylvania Guenon Commission.*

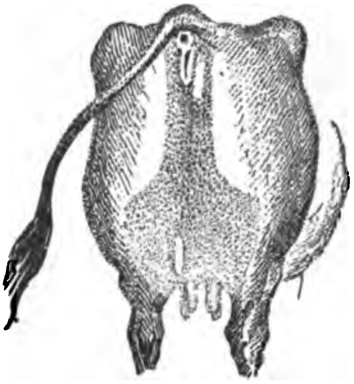
In the following descriptions of the ten classes, and their sub-division into six orders each, we give the quantity as stated, for a large-sized cow. Not thinking it worth while to enter so minutely into his sub-divisions of high, medium, and low cows. For instance, to class one, order one, he gives to the high cow twenty-four litres, which is about equal to our twenty-four quarts here; the litre being exactly two and one eighth wine pints. To the medium cow he gives nineteen quarts, and to the low cow, fourteen quarts, per day. The size of his high cow is five hundred and fifty to six hundred and fifty pounds, *dressed weight;* the medium, three hundred and twenty-five to four hundred and fifty pounds; and the low, one hundred and ten to two hundred and twenty-five pounds. As most of our cows will range with the high cows, we have adopted the scale suitable to the size, only the reader who practices the system must keep in mind that the larger and more developed the cow, the more she will be likely to give than the cow of smaller size.

First Class. The Flanders Cow.

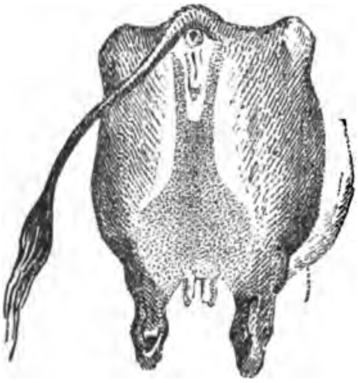


Cows with this escutcheon are the most seldom found, except among the most abundant milkers. In the first order they give twenty quarts per day, in the height of their flow; that is to say, from the time they have calved until they are pregnant again. Then they diminish, little by little, until their next calving. It is best to dry them off from four to six weeks before calving, to give them a needed rest, and it improves the calf.

Cows of the first class have a soft udder, with fine hair on it, rising until it blends with similar hair growing upward on the thighs, above the hock, and widening on the thick part of the thigh, then narrowing, like in the engraving, until it reaches the vulva, and being about two inches on each side of it. The inner parts of the thigh, and the vertical mirror are usually of a yellowish or nankeen color, with dark spots on them, from which can be detached the dandruff. There are two ovals on the udder, of fine short hair.



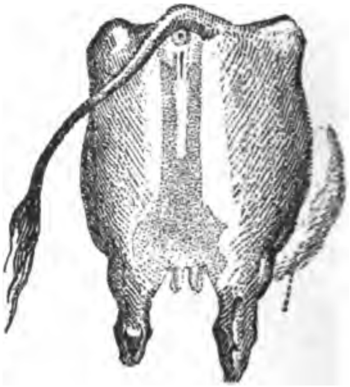
The second order of the first class are similar to the first, but the escutcheon is smaller; and on the right side of the vulva is a tuft of descending hair about two and one half inches long and one and one half inches broad, and there is but one oval on the



udder. They yield eighteen quarts of milk for a period of eight months.

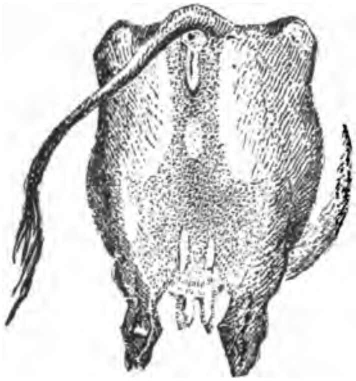
The third order of the first class is still smaller, and not quite so decided in shape. It has also a semi-circular tuft below the vulva of small size, of descending hair, rather shining and of brighter color. There is either only one oval on the udder, or generally none.

Cows of the third order yield sixteen quarts, and milk for six months.



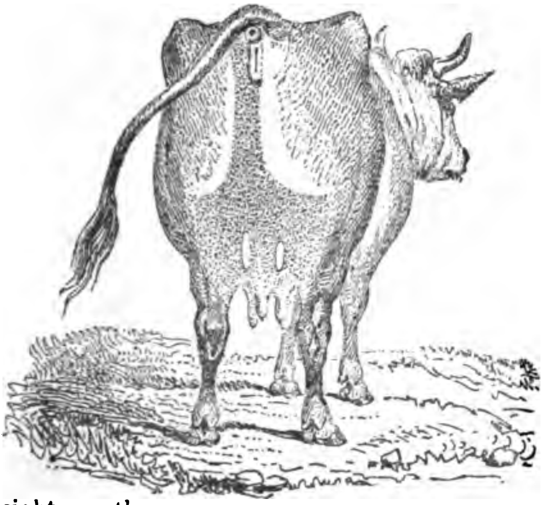
The fourth order of the first class, besides being still smaller, has narrower thigh escutcheons, and lower down; also the tuft under the vulva is quite long, about five or six inches, which sometimes make the vertical escutcheon terminate in a fork. This tuft has more lustre and is whiter than the hair around it. There is also a thigh tuft of half oval shape on the right of the escutcheon, about five inches high.

Cows of the fourth order yield twelve quarts a day, and milk five months.

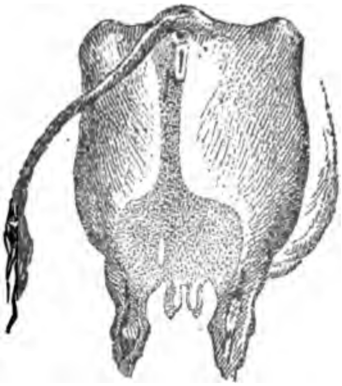


The Bastard Flanders have two marks which distinguish them: 1. Some have on the vertical escutcheon an oval tuft, about the middle of it; this tuft has descending hair, is about three inches long and two inches wide, and the lustre of the hair makes it appear as if it was whiter than that around it. The larger the oval the sooner the milk will fail, and the smaller it is the longer will she milk. 2. Other Bastards of this class are distinguished by the ascending and descending hair interfering with each other on the outlines of the escutcheon, looking feathery, or bristling like the beard of wheat. The skin is fine and reddish, but there is no dandruff. The larger the escutcheon, and the finer the hair, the more abundant the milk; but when the hair is coarse, long, and thin, the yield is small. Both kinds of Bastards of this class have every other appearance of the best cows. And all Bastards of the first classes have the two ovals on the udder.

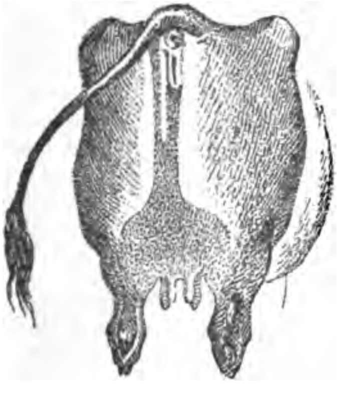
Second Class. Left Flanders.



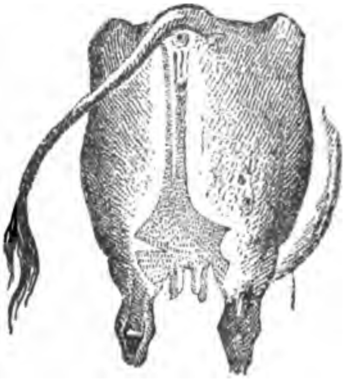
The cows of this class are very similar to those of the first class, though their yield is rather less. The vertical escutcheon is entirely to the left of the vulva, and the thigh escutcheon on the right is broader than that on the left. By comparison with the first class, these will be seen to be very similar, but in each order smaller; therefore, it will not be necessary to describe them separately, but simply to state the yield. Cows of the first order of the second class will yield forty-eight quarts, and milk eight months.



The second order of the second class have the lip-shaped tuft to the left of the vulva, and have one oval on the left of the udder. Cows of this order give sixteen quarts, and milk seven months.



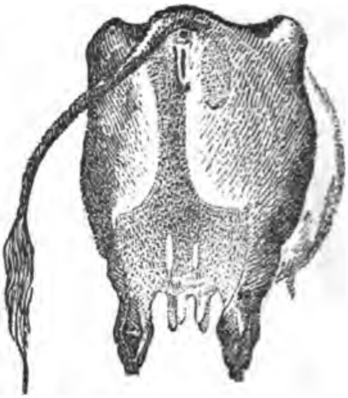
The third order has the same shaped escutcheon, but more contracted, and the lip-shaped tuft is larger and whiter. Cows of this order give fourteen quarts, and milk six months.



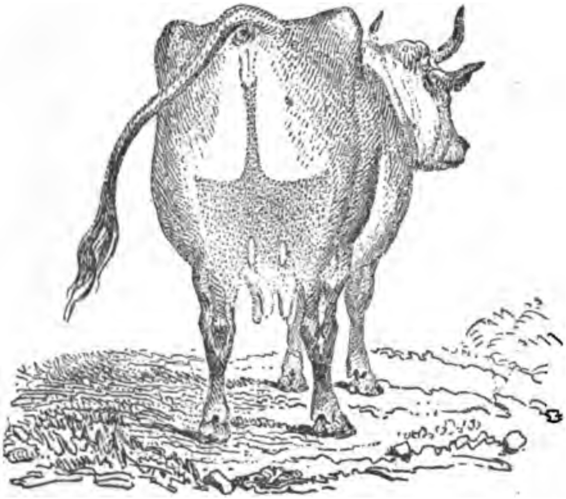
The fourth order has two invasions of the thigh escutcheon by the down-growing hair, a semi-oval one on the right, and a triangular one on the left. These always indicate a reduced quantity of milk.

Cows of the fourth order give ten quarts, and milk five months.

The escutcheon of the Bastard Left Flanders is known by this peculiarity. The developments are larger and more irregular on the top of the vertical escutcheon, and to the left of the vulva; on the right is the ischiatic tuft, quite large, from which the hair is diverted in an almost horizontal direction.



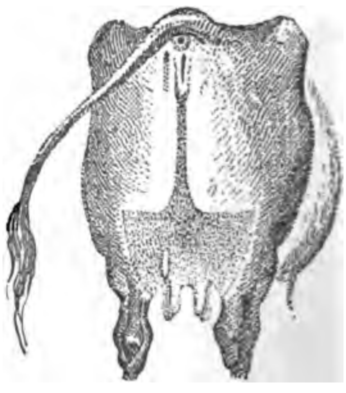
Third Class.—Selvage.

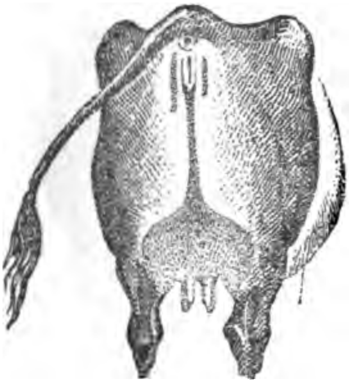


The escutcheon of this class commences above the hock, runs up on the thighs quite high, thence it descends somewhat from both sides to the vertical portion, which rises, gradually narrowing to the vulva.

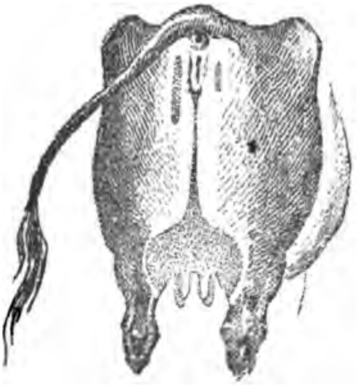
The first order of the third class has an udder with soft skin, and fine downy hair, which, as well as the thighs, are of a yellow or nankeen cast of color. There are two ovals on the udder. Cows of the first order give nineteen quarts, and milk eight months, and often will milk nine months, not going dry unless made to.

The second order is similar to the first, only of reduced size; it has a tuft to the left of the vulva; and only one oval on the udder on the left side; the hair of the escutcheon is generally more glossy than that around it. Cows of the second order give seventeen quarts, and milk seven months.



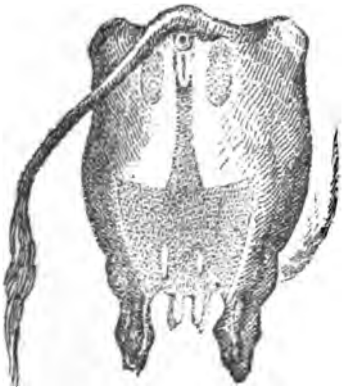


The third order escutcheon curves downward on each side of the vertical mirror, which rises narrowing to a point at the vulva; to the right and left of the vulva are tufts, the one on the left being the longest; on the left of the udder is sometimes an oval. Cows of the third order give fifteen quarts, and milk six months.



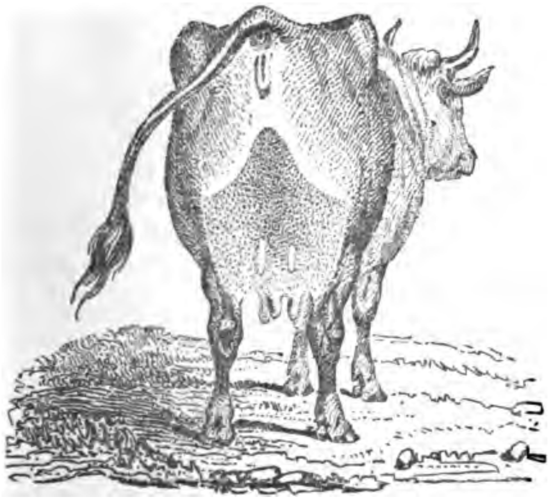
The escutcheon of the fourth order is of similar shape, but still smaller; but the tuft on the left of the vulva is much longer than on the right, and there is no oval on the udder.

Cows of the fourth order give twelve quarts, and milk five months.



The bastards of the third class have two tufts, one on the right, and one on the left of the vulva, about four to five inches long, and one and one half inches wide. The smaller they are, and the finer the hair on them, the less rapid is the loss of milk. But if they are large and have course hair, and are pointed at each end, they prove the milk to be poor and serous, and the cow will fail rapidly.

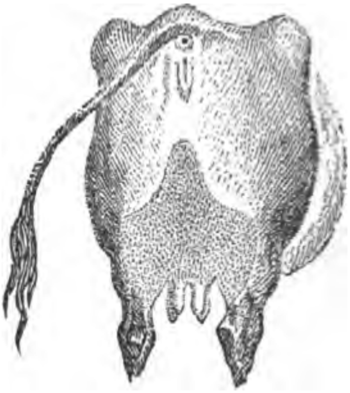
The Fourth Class. Curveline.

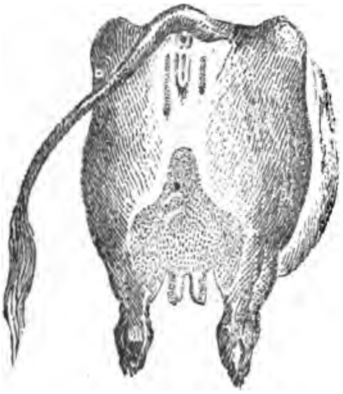


The Curveline cows are very plenty, and are of a very good grade, approaching the first class. The escutcheon is broader than the last two classes, in the upper part. Their skin is of delicate texture, and nankeen shade of color on the escutcheon. The higher and broader the curved line rises toward the vulva, which it never reaches, the better it is. There are two ovals on the udder. Cows of the first order of the fourth class give 19 quarts, and milk eight months, and sometimes up to their next calf.

The second order have the same shape escutcheon, but more contracted. There is but one, and sometimes no oval on the udder. On the left of the vulva is a small tuft.

Cows of the second order give seventeen quarts, and milk seven months.



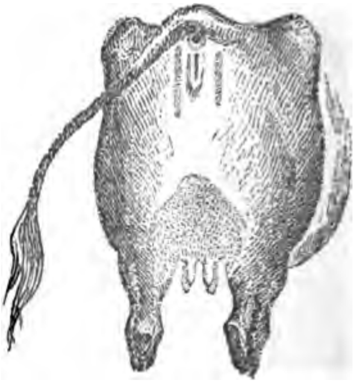


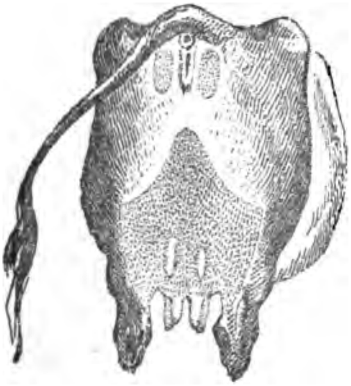
The third order has a smaller escutcheon, with two tufts by the vulva, the left longer than the right, about four inches by one inch wide. Sometimes an oval on the left side of the udder.

Cows of the third order give fifteen quarts, and milk six months.

The fourth order has a much smaller escutcheon, reaching just above the udder. The two tufts are larger alongside the vulva, and the hairs bristle to each side. On the right, the downgrowing hair intrudes somewhat upon the escutcheon.

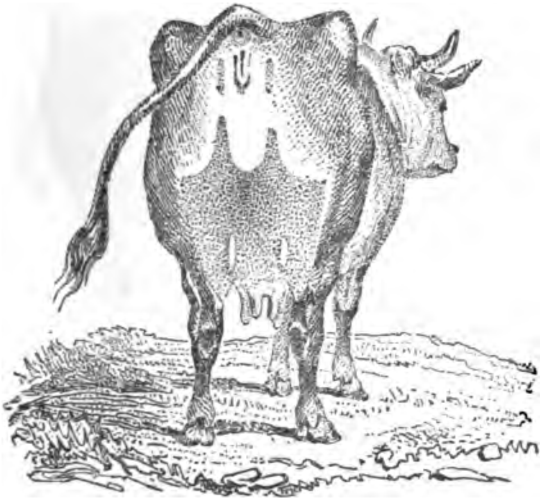
Cows of the fourth order give twelve quarts, and milk five months.





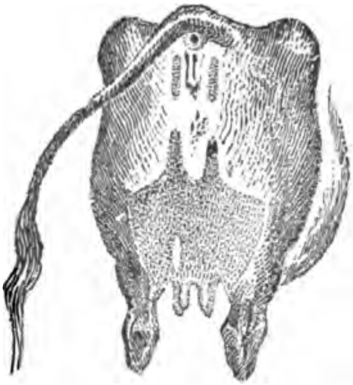
The Bastards of the fourth class have a fine appearance of escutcheon, but they are known by the tufts alongside the vulva. If they have coarse bristly hair, and of large size, say four to five inches long, and one and a half in width, they indicate a rapid loss of milk as soon as pregnant, particularly if they are pointed at each end.

The Fifth Class. The Bicorn.



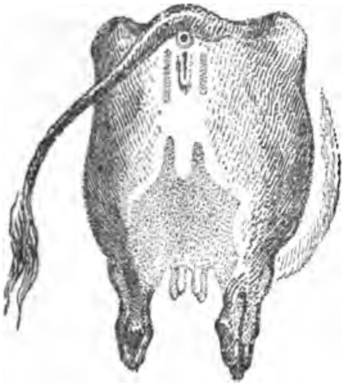
The escutcheons of this class in the vertical portion end below the vulva in an indented shape, presenting the appearance of two upright horns. Their udders are of a saffron color, delicate, with fine, soft hair, and have much dandruff.

The first order has two tufts of small size along the vulva, and two ovals on the udder. They give seventeen quarts, and milk eight months.



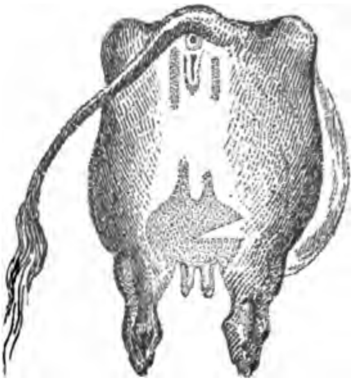
The second order are similar to the first, only smaller escutcheons, the vulva tufts are longer, and there is but one oval on the udder, on the left. The right horn of the escutcheon is smaller than the left one.

Cows of the second order give fifteen quarts, and milk seven months.



The third order have similar escutcheons to the last, but smaller, while the vulva tufts are larger, there are no ovals, and there is an invasion of the descending hair on the right side. The right is two inches shorter than the left.

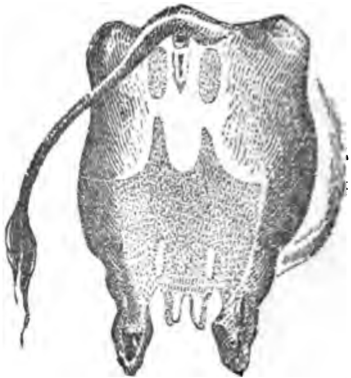
Cows of the third order give thirteen quarts, and milk six months.



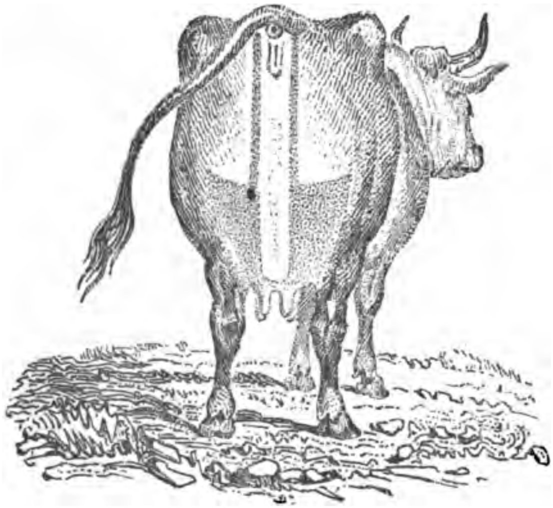
The fourth order have the same shaped escutcheon, but smaller, with two tufts alongside the vulva, larger than those on the last. On the right of the escutcheon is a triangular cut in the shape, made by encroachments of the down-growing hair.

Cows of the fourth order give ten quarts, and milk five months.

The Bastards of the fifth class have the full escutcheon of the first or second orders, but with two large tufts alongside the vulva, which, according to their size, and more or less pointed shape, and fine or coarse hair, indicate the more or less stoppage of the flow of milk.

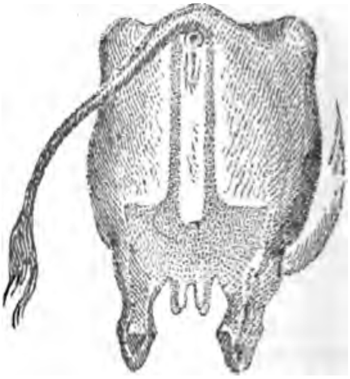


The Sixth Class. Double Selvage.

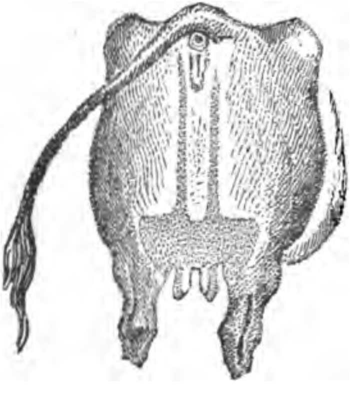


The escutcheons of Double Selvage cows differ from those of Selvage, or the third class, in that the escutcheon is marked in its whole length by a strip of hair descending and dividing it into two equal portions. It is bordered in its whole length and at the extremity by a double line of ascending hair, which extends the escutcheon up to the vulva. Otherwise it is like the selvage escutcheon.

The first order cows have a fine udder, soft, and covered with a silky down; and its skin is yellowish or nankeen. Cows of the first order give eighteen quarts, and milk full eight months.

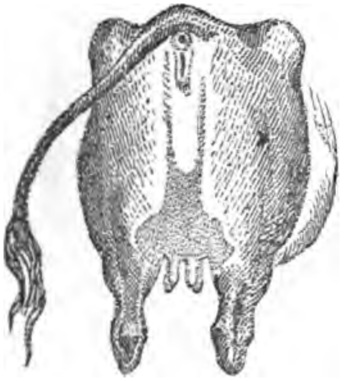


The second order have a similar escutcheon, but smaller, and the separating strip ends higher up. Cows of the second order give sixteen quarts, and milk seven months.



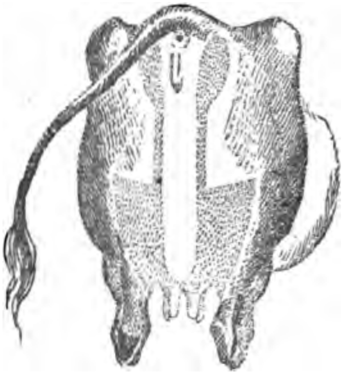
The third order have a still more reduced escutcheon, the descending strip terminating at the udder.

Cows of the third order give fourteen quarts, and milk six months.



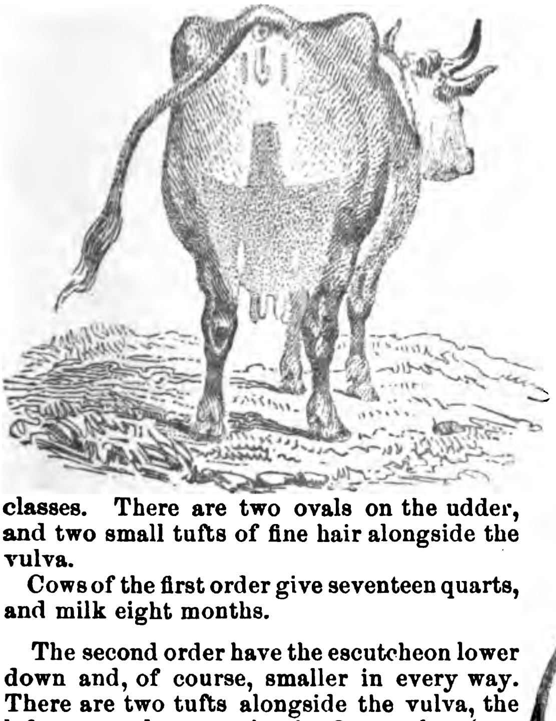
The fourth order have an escutcheon more broken in appearance, the two side lines of the selvage terminate half way to the vulva, and end off in lines of a feathery appearance, the hair is coarser and more furry,

Cows of the fourth order give ten quarts. and milk five months.



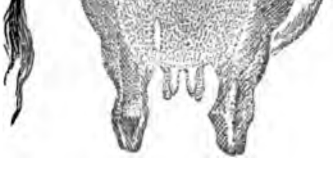
Bastards of the sixth class have the escutcheon similar to the first class, but the selvage lines terminate on each side of the vulva in tufts of coarse and bristly hair; the larger and coarser they are, the sooner the milk will fail.

The Seventh Class. Demijohn.



The first order of this class has the skin of the escutcheon of yellowish color. The udder is fine, and covered with a silky down to the inside of the thighs; and the dandruff is soft and oily to the touch. The shape is similar to the selvage somewhat, only the vertical mirror rises broader and straighter, and ends half way up to the vulva, cut square off. The broader and higher this part is, the better the escutcheon. The escutcheon is not so high up on the thighs as the previous classes. There are two ovals on the udder, and two small tufts of fine hair alongside the vulva.

Cows of the first order give seventeen quarts, and milk eight months.

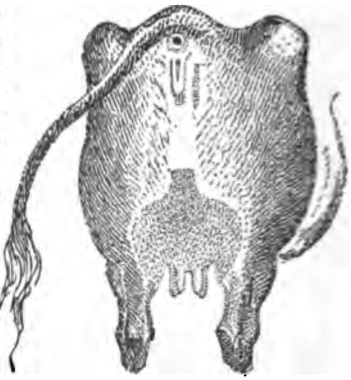


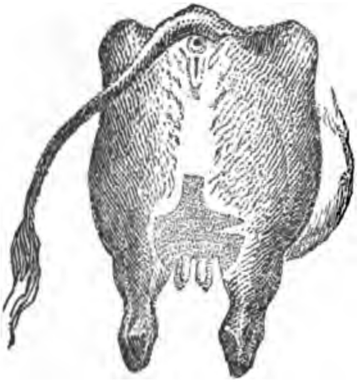
The second order have the escutcheon lower down and, of course, smaller in every way. There are two tufts alongside the vulva, the left one as large as in the first order, (two and a half inches,) the right one only half as long. There is one oval on the left of the udder.

Cows of the second order give fifteen quarts, and milk seven months.

The third order escutcheon is of different shape, the lines converging downwards from the vertical mirror, which is short, and cut off square. The right side frequently has a curved line from the descending hair invading it. The vulva tufts are longer than in the second order.

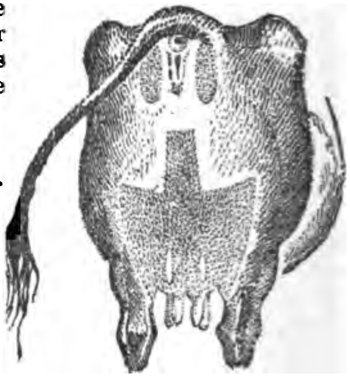
Cows of the third order give thirteen quarts, and milk six months.





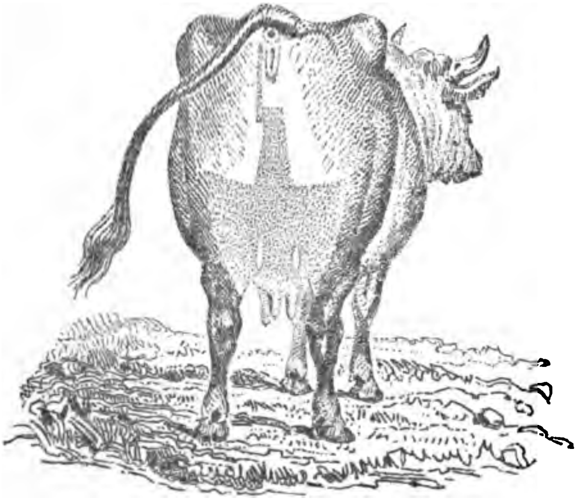
The fourth order has the escutcheon still smaller. The tufts alongside the vulva are not so plain, but the hair is coarse and bristly. There is a triangular invasion on the right of the escutcheon.

Cows of the fourth order give ten quarts and milk five months.



The Bastards of this class have a good escutcheon, but the tufts are large and of coarse, bristly hair, and will fail according to the size.

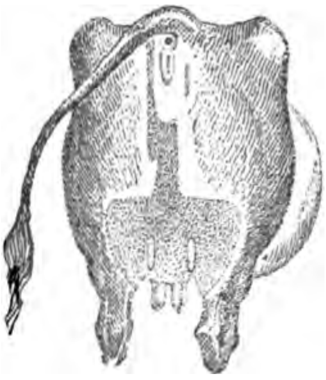
The Eighth Class. Square Escutcheon.

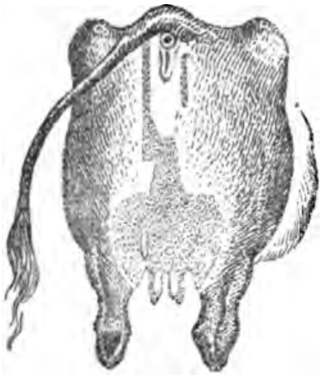


The first order of this class have the same yellowish color on the escutcheon as other first orders; the udder is flexible, covered with a short, fine down. The escutcheon is much of the shape of the Demi-johns, but the vertical, as it rises, branches square off to the left, and ascends, straight and narrow, to the left side of the vulva. There are two ovals on the udder. The more the square approaches the vulva, and the finer the hair, the greater quantity is there of milk. Cows of the first order give seventeen quarts, and milk eight months.

The second order have a similar escutcheon, only smaller in every way. They have two ovals on the udder, and a small tuft to the right of the vulva.

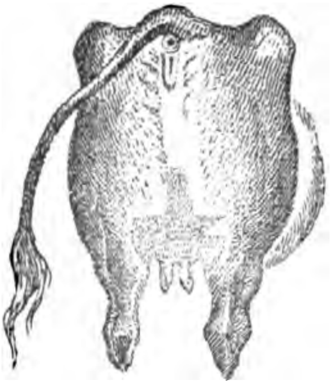
Cows of the second order give fifteen quarts, and milk seven months.





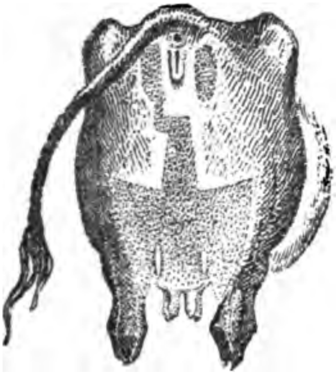
The third order have the escutcheon still smaller; the lines curving downward at the corners; one oval on the udder, and the tuft to the right of the vulva, larger and of coarser hair.

Cows of the third order give thirteen quarts, and milk six months.



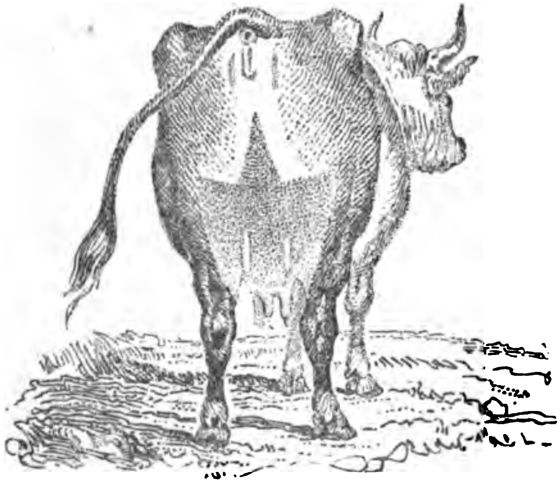
The fourth order have the escutcheon much smaller, the square is much lower, and the upper part of it is formed of bristly hair, and feathery looking; as is also the tuft to the right. On the right side of the escutcheon is an invasion of triangular shape.

Cows of the fourth order give ten quarts, and milk five months.



The Bastards of the eighth class are distinguished from those of the first order by the tuft on the right, which is of coarse and bristly hair, and the square terminates also in the same hair.

The Ninth Class. Limousines.



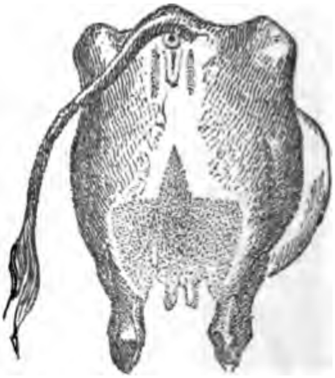
The escutcheons of this class, in ascending toward the vulva, do so in the shape of a spire, but stop short about half way.

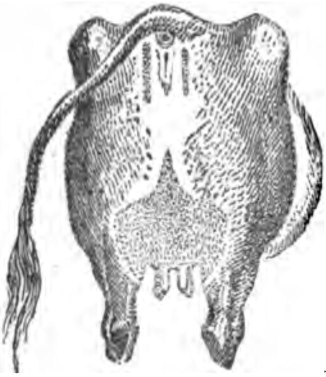
The first order has the escutcheon of yellowish color, with flexible udder, covered with hair downy and silky. The shape is the same as the seventh and eighth class, except that the vertical escutcheon ends in a sharp point, like a spire or arrow head. There are tufts along each side of the vulva, and two ovals on the udder.

Cows of the first order give fifteen quarts, and milk eight months.

The second order is similar in the escutcheon, but smaller, with but one oval on the udder, and the vulva tufts larger, the left being longer than the right.

Cows of the second order give thirteen quarts, and milk seven months.



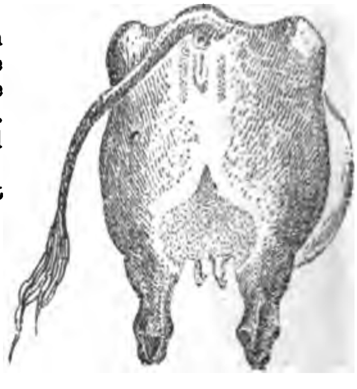


The third order is again smaller; the corners rounded downward; the tufts larger; no oval on the udder.

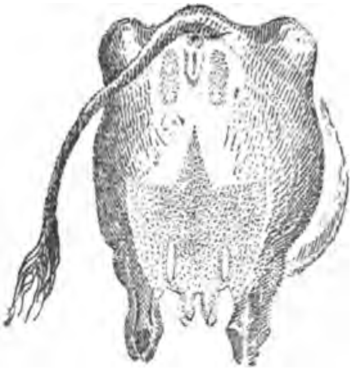
Cows of the third order give ten quarts, and milk six months.

The fourth order same shape as the last, but still smaller and more rounding. The vulva tufts are of bristly hair, and the left one is seven inches long.

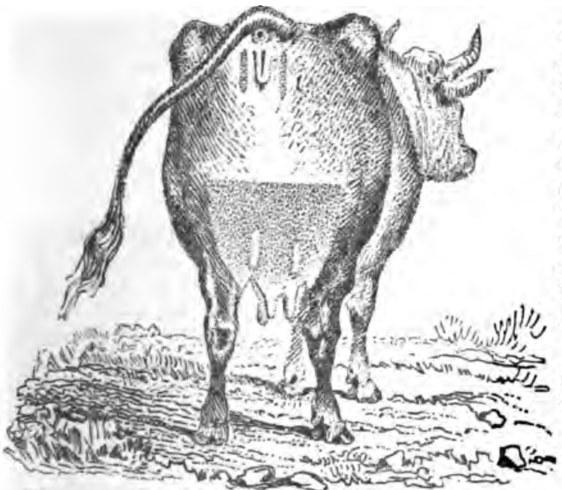
Cows of the fourth order give eight quarts, and milk five months.



The Bastards of the ninth class have a good escutcheon, but are distinguished by the large tufts of coarse, bristly hair alongside the vulva.



The Tenth Class.—Horizontal.

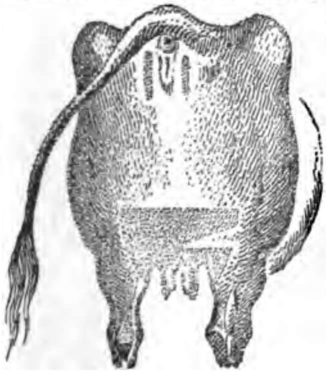


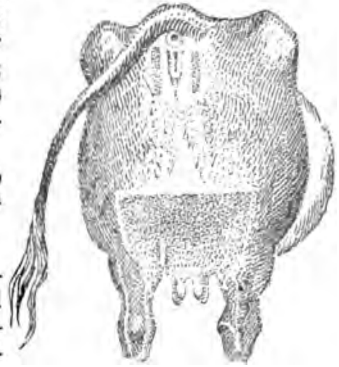
The first order have a dandruff of yellowish color; the hair is short, fine, and silky; the escutcheon is lower down from the vulva than the other classes, and is cut off by a horizontal line. There are two ovals on the udder; and two tufts, about three and one half inches long, on the sides of the vulva.

Cows of the first order give thirteen quarts, and milk eight months.

The second order has a smaller escutcheon; the vulva tufts are larger, the right shorter than the left; there is but one udder oval; in several of the orders of this class there is a small streak of ascending hair directly below the udder.

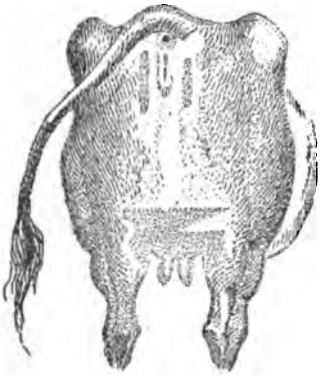
Cows of the second order give ten quarts, and milk seven months.





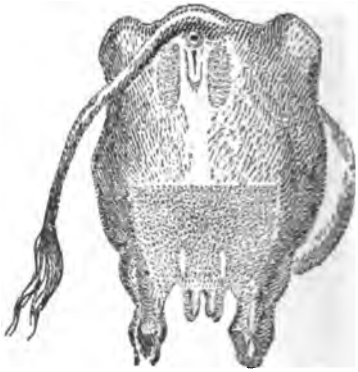
The third order have still smaller escutcheons; larger vulva tufts, the one on the left of bristling hair, four to five inches in length. The descending hair encroaches on the escutcheon on the right in a triangular shape.

Cows of the third order give eight quarts, and milk six months.



The fourth order have still smaller escutcheons; larger and coarser vulva tufts; and an invasion on the escutcheon on the right in triangular shape, and on the left of semi-circular shape.

Cows of the fourth order give seven quarts, and milk five months.



The bastards of the tenth class have the escutcheons large and good shaped; but are distinguished by the tufts alongside the vulva, these tell how long she will milk, by their size and the grade of the hair on them.

Escutcheons on Bulls.

Guenon applied his discovery to bulls to great advantage. He found that bulls belonged to the same classes as cows, and had escutcheons similar, but much smaller; these extend from the testicles upward toward the anus. The importance of having a good bull becomes apparent when we reflect that he "gets" from fifty to one hundred, annually, while the cow is impregnated but once in the year. The escutcheons of the progeny of a cow with good escutcheon will be much improved if the cow is coupled with a bull well marked, and particularly if his escutcheon is the same as that of the cow. Better have the two of different breeds, but of similar or good escutcheons, than to have the bull with inferior escutcheon.

Of course, the higher up the escutcheon extends on a bull, and the broader it is, the better it is, but we must not look for bulls to be so well-marked as cows are, for they never are. To distinguish the bastard bulls from the good ones, observe if there are any streaks of descending hair, and mixing so as to be bristly. This indication will be a certain one in proportion to the size of the blemish, and as that is in proportion to the whole escutcheon

OFFICIAL REPORTS OF COUNTY SOCIETIES.

Berks County Fair.—By W. G. Moore.

The twenty-fourth annual fair of the Berks County Agricultural and Horticultural Society, which was held October 1, 2, 3, and 4, was one of the best exhibitions thus far given by the society. The display in all the departments was very good.

In the horse department I found far more Norman stallions, mares, and colts than at any previous exhibition, the most of these animals were of very superior build, which speaks well for our county, showing that farmers are improving their breeds of work horses. They will be amply repaid for this in the course of a few years, when they seek a market for their overplus stock, as there is always a good demand, with high prices, for well-shaped, sound, heavy horses. The display of Hambletonians, Patchens, Ethan Allens, Ironsides, &c., has always been creditable, as Berks has for years been engaged in raising trotting stock.

The display of horned cattle, consisting of Jerseys, Ayrshires, Guernseys, Durhams, Holsteins, Devons, and grades, was the largest and most creditable that the society has made for some years.

The display of swine and sheep was so large that many new stalls were required for their accommodation.

The poultry display was better and larger than any heretofore made on the grounds. There were two hundred and twenty-three coops, and the strains show careful breeding. This county contains a large number of poultry fanciers, many of whom yearly dispose of large numbers of fowls and eggs. In connection with the large and creditable display in the poultry department, it is due to the Berks County Poultry Society to say that they are entitled to great credit for their active coöperation in making this display a grand success. The pioneers in the improved strains of poultry in this county were the late Dr. William Moore and William M. Wells, Esq.

The fruit display was also very fine, and although this was an off year for apples in this section, there were fifty-two exhibitors, the most of whom had from twenty to thirty different varieties on exhibition. Peaches, pears, plums, quinces, and grapes were also found in abundance. The department of plants was particularly fine. Vegetables were not in so great profusion as in former years.

There was a good display of flour and grain, and among these exhibits were some fine varieties of Clawson, Fultz, and Waterloo wheat, grown from seed furnished by C. T. Fox, Esq., the former active secretary of this society.

The exhibits of bread and butter, canned fruit, preserves, &c., were very good, and show that in this important department the good housewives and young ladies of our county are perfectly at home.

The receipts for the entire week from all sources footed up the handsome sum of about $5,200, an amount sufficient to pay all the premiums, the expenses, and the greater portion of the floating debts of the society. The receipts, although about $1,000 higher than those of last year, show a falling off as compared with some former years, partly due, no doubt, to the existing hard times.

I would in this connection say, although I do so with regret, that there seems to be an organized effort on the part of some of the members and even officials of this society to fill up some of the entries for premiums solely for the purpose of getting all the money they can from the society. The premiums carried away by this combination, for some years past, amount to considerable, and will, eventually, I think, prevent many persons from making exhibits, and thus very materially injure the society.

The Fourteenth Annual Fair of the Blair County Agricultural Society.

President, D. D. Morrell; Recording Secretary F. Jakel, Hollidaysburg; Treasurer, J. Gardner.

Secretary Jakel furnishes the following account of the fall fair held October, 1, 2, 3, and 4.

Ever since the society was chartered, in March, 1853, it has been of slow but steady growth. Four hundred and twenty-one shares of stock, each one dollar per share, have been subscribed.

The late fair held at Altoona Park was a success financially, because few societies in this State, if any, cleared expenses this year at their fall fairs. It was a greater success, if we take into consideration the scarcity of money, the indifference, almost antipathy, of the people in different sections of the county; this, together with the unfortunate feeling frequently expressed by a great many of our people, that no society can be conducted in an honest and fair manner, made a success dubious. It is therefore the duty of the directors to publish the accounts of the treasurer as well as the financial condition of the society. In regard to the exhibits, I am sorry to state that some townships of this county were not represented at all by anything, and the display in some classes was far from being satisfactory. No previous preparation whatever had been made through the county, allowing a few exceptions. It was only about a week before the fair opened that the Altoona people made spirited preparations. In some classes they were the exclusive exhibitors, and made very creditable displays.

A county or any other fair is held for the purpose of bringing to public notice the best farming and productions of home industry, as well as to give the sinew of our nation a holiday, to bring them together to exchange ideas and become acquainted with our resources as well as the means by which to improve their homes and farms, and thereby their conditions. To offer a small reward, in shape of a premium, to the best exhibitor, is to serve as an incentive as well as a compensation for expenses which people have who take the trouble to exhibit their stock or produce. A committee is appointed to award premiums for meritous articles.

They should be very careful and with pride attend to their duties. While some of the committees go to a great deal of trouble and labor to ascertain the merits of exhibits and award premiums, which the society always pays with pleasure, yet I am sorry to say that some committees think every article on exhibition, whether meritous or not, should have a premium award it, and by that put those exhibitors who generally send their goods to fill up, on an equal footing with those who have taken time and trouble to produce something which is worth all and more than the society can give. I would recommend a thorough revision of the premium list. Reduce some premiums and enlarge others. I also would advise that premiums consisting of farm implements, blooded stock, and an agricultural weekly, for instance, the *Practical Farmer*, published in Philadelphia, be offered and awarded as premiums. No persons should be appointed judges who are not members ot the society by at least one share of stock, or have shown in the past some interest in the society.

The exhibits of farm stock, horses, and cattle were good; poultry excellent. The best breeds of chickens can be procured by Mr. H. H. Hewitt, of Williamsburg, without paying fancy prices, and the money can be kept in the county. Fruit had been killed by frost, and very little was on exhibition; yet, that which was there was of a very fine quality. The vegetable department was poorly represented. Needlework was very good, and the ladies of Altoona, who alone, with one or two exceptions, had filled this department, deserve much credit, and the thanks of the society.

Bucks County Fair—Doylestown Agricultural and Mechanics' Institute—By Eastburn Reeder.

The Fourteenth annual exhibition of the Doylestown Agricultural and Mechanics' Institute, was held on the society's grounds on October 1, 2, 3, and 4, 1878. The weather was all that could be desired. On Tuesday, the first day, the exhibits were brought in, and put in their proper places. The paid admissions on this day were few. On Wednesday, everything was in readiness for inspection, and crowds began to arrive early in the day. The paid admissions were seven thousand four hundred and thirty-two, and about eight thousand people were upon the grounds. The receipts, at twenty-five cents per head, amounted to nearly $2,000. On Thursday, the admission was fifty cents, and the receipts about the same as the day previous, making the attendance, on Thursday, about four thousand. On Friday, the attendance was about the same as on Thursday, (four thousand,) which, at twenty-five cents a head for admission, amounted to $1,000. The total receipts of the fair, including admissions, $5,000; entrance fees $1,000; restaurants, shows, &c., $1,000; will foot up, altogether, about $7,000, which ought to pay premiums, current expenses, &c., and bear a balance in the treasury.

THE EXHIBITS—HORSES.—Prominent among these, was the thoroughbred stallion "Oakland," owned in New Jersey, but entered and exhibited by Reading R. Gaddis, of New Hope, Pa., at whose stable he made the season of 1878, for the improvement of the stock of horses in this county.

The trotting occupied the greater part of three days. In all, thirteen speed premiums were offered, amounting to over $2,000. To contest for these premiums, over eighty different horses were entered—from three to thirteen entries in each class. No very great celebrities in the trotting list were presented. The fastest time made was 2.32¾.

The society has over one hundred stables for horses, which were all filled, many of them containing two animals, and it is safe to say that from one hundred and twenty-five to one hundred and fifty horses were on exhibition.

CATTLE.—There were one hundred and twenty head of cattle in the stalls. A very fine herd of Durhams was exhibited by John Carroll, junior, of Hunterdon county, New Jersey, numbering nine head. Prominent in this herd was the very fine bulls "General Sherman," six years old, and Pontiac, three years old, either of which would weigh over a ton. Mr. Carroll also exhibited four Holsteins and specimens from both the Ayrshire and Devon breeds. T. S. Cooper exhibited a herd of Ayrshires numbering eleven head. William M. Eby exhibited five Durhams, but not numbering sufficient to make a herd. E. Reeder showed a herd of eight registered Jerseys, headed by the bull "Lord Delaware," and cows "Firefly" and Isabelle. Ezra Michiner showed a herd of registered Guernseys, headed by the bull "Sir Champion, junior." The balance of the cattle were grades, natives, fat cattle, &c. In the department of dairy cows on trial were some noteworthy animals. I desire particularly to notice the grade Holstein cow shown by Charles L. Allen, of Warrington, and the grade Devon and native cow shown by Lukens & Bisson, of Doylestown, Pa. Both of these cows were entered for milk production. The record of the former being fifty-two pounds per day, tried in the fall and winter months, and of the latter sixty to sixty-five pounds per day, tried in the spring and summer months; the former coming in in September and the latter in February. It is really difficult to tell which is the better cow of the two. Mr. Allen's cow certainly makes much the best show at exhibition time. I examined both of them carefully with reference to the Guenon system, and class Mr. Allen's as Flanders second and Mr. Bisson's as Flanders third. Judged by other signs deemed by Mr. Baldwin, of Ohio, as infallible, Mr. Bisson's cow has the advantage, viz: A perfect double chine, with three cups or indentation; larger, more crooked, and longer veins in front of the udder, &c., &c. These cows, and indeed all the cattle on exhibition, were *more critically examined by the people generally than I have ever noticed before at our fairs*, and I ascribe the cause to the recent labors of the Guenon commission among us. I did not find a Flanders first on exhibition and believe them to be as scarce as one to a thousand, or even ten thousand.

SHEEP.—Seventy-three head were on exhibition, which is quite a falling off from former years. The cause is the extremely low premiums which the managers have seen fit to adopt. Three dollars, for a pair of ewes, as first premiums, and one dollar for second, with an entrance fee of ten per cent. on the first, is not an inducement sufficient for exhibitors in this department to bring out their stock, and those that were there were brought with other objects in view. E. Reeder exhibited sixteen head from his flock of Southdowns. Jeremiah McCain, of Warren county, New Jersey, exhibited nine Southdowns. Mr. McCain also had in charge, and upon exhibition, eight head of Oxfordshires, from the flock of Hon. H. C. Kelsey, of New Jersey, and eight head of Cotswolds of his own. Leicesters and grades were shown by S. G. Doan, Charles L. Allen, Horace Michiner, and others of Bucks county.

SWINE.—The display in this department was the best we have had for years. James C. Roberts, of Chester county, was present with twenty-seven head of Chester whites, and his centennial certificate of award. Chester whites were shown by Dr. I. Michiner and David Fell, of Bucks county. Yorkshires were shown by William H. Cole, of Clinton, New Jersey, (fifteen head,) and J. McCain, of New Jersey, (eleven head.) Cheshires: twenty-two head by Scott Bros.—J. Scott, E. Scott and J. S. Keith, Bucks county. Of the black and variegated breeds, T. S. Cooper exhibited eleven head, and Lukens and Bisson, eleven head of Berkshires, each. Of Poland Chinas, Dr. S. R. Dubs, of Bucks county, exhibited fifteen head; S. M. Gainer, one; and J. McCain, of New Jersey, nine animals. A single Essex was shown by Scott Bros., making in all one hundred and thirty-nine hogs and pigs.

POULTRY.—The display in this department was full, embracing the usual varieties of fowls and pigeons by twenty different exhibitors.

The display of farm machinery by Hulshizer & Larzelere, of Doylestown; Heebner & Sons, of Lansdale; Buckman, Blaker & Co., of Newtown; and Mahlon Atkinson, of New Hope, made quite an attractive display. Among the novelties in this department was Frederick Meyer's incubator. Machines capable of hatching two hundred eggs at a time can be had for thirty-five dollars. They will attach to any coal stoves, and are self-regulating. The eggs had been set so as to hatch during the fair, and was always surround by a crowd.

CARRIAGES, FURNITURE, &c., were exhibited by Messrs. Kratz, of Danboro' and Plumsteadville; McLear & Kendall, of Philadelphia. Furniture by Gotwald & Sons, of Gardenville; and S. L. Stockton, of Lambertville, New Jersey.

FRUIT.—The display of fruits was fair for the season, and attracted much attention. Over *thirty* different exhibitors, each showing from one to twenty varieties.

GRAIN AND VEGETABLES.—The exhibits of grain and vegetables was not large, and it was remarked that the farmers of Bucks county had not done themselves justice in this department.

HOME DEPARTMENTS.—Most of these departments were filled to overflowing. Twenty-five to thirty samples of butter; bread and cake in unstinted supply; preserves, jellies, pickles, and canned goods almost beyond computation, made a most magnificent display. These, taken in connection with the elegant display of needle-work, fancy articles, &c., made the fourteenth annual exhibition of our society fully up to the average of its predecessors.

The Chester County Agricultural Socielty Exhibition of 1878.

Evans Rogers, president, West Chester; A. M. Eachus, secretary, West-Chester; Josiah Hoopes, corresponding secretary, West Chester.

This society was organized in 1853, upon a stock basis, and has issued twelve hundred and seventy shares of stock, at a par value of ten dollars per share. The owner of two shares is entitled to an annual ticket, admitting himself and a limited number of his family. Each holder of more than two shares is entitled, in addition to the above privilege, to a single admission ticket for each share of the surplus. Season tickets admitting the holder during all the days of the fair, are sold for one dollar. Single admission tickets are sold for fifty cents.

The grounds of the society, inclosing twenty-one acres, are within the limits of the borough of West Chester, and, with the improvements, are valued at $20,000. The improvements consist of an ample main building for the exhibit of household products, a permanent floral hall, a track stand, buildings for agricultural implements, vegetables, and poultry, ample cattle and sheep-pens, extending around two sides of the ground, and a half mile track, which is one of the finest in the State. Visitors and stock are supplied with water, from wells conveniently located in various parts of the grounds.

The regular fall exhibition was held September 19, 20, and 21, and was one of the most successful ever held by the society. The attendance was not so large as during some other years, but there was a marked improvement on the display of farm stock, farm crops, and other exhibits.

The well-filled floral hall, under the care of Messrs. Hoopes and Kift, was one of the most prominent features of the exhibition. The surrounding florists entered into a generous and earnest competition for the prize to professionals, and the competition for prizes to amateurs was well contested. At all the preceding fairs, the fruit had been exhibited in the main hall, but all the space there having been needed for the household department, it and flowers were mingled in the floral hall, and it was evident that neither class suffered by the close contrast. It was the almost universal opinion that the presence of the fruit was an advantage to the floral display, fully compensating for the space occupied. The plan of arranging the fruit around a large pyramid in the center of the building, was not only novel, but effective, showing it off in a manner not to be accomplished in any other way.

The large main building was filled by the ladies with samples of household work, among which the products of the kitchen were by no means neglected. A prominent feature in this building, and one which we would commend to the favorable notice of all societies which have not already adopted it, was a department specially for children, embracing not only fancy work, but also the more substantial items of pies and cakes. President Rogers appreciates the fact that under his own or some other administration, the children of to-day, will become adult exhibitors of the future. The constant circle of children which congregated around this department, and the number of specimens exhibited, were evidences of their appreciation of the chance to display their proficiency in household matters. The ladies of the society deserve great praise for the energy displayed in this department.

The display of agricultural implements was good, and the need of more shedding was made evident by the large number of exhibits in the open air. The implement manufactures of the county emulated each other in their display, and the sweapstake prize for the largest and best display was not awarded without some trouble on the part of the judges.

In the live stock department the display was notably an advance on that of former years, there being over one hundred more entries this year than last. No doubt much of this improvement is due to an increase in the amount of premiums, but much of the credit is due to a united effort on the part of the managers to induce stock breeders to bring out their stock. For a county given up almost exclusively to dairying, the display of thorough-bred and grade stock was very creditable.

Notwithstanding the fact that the premiums had been decreased, the entries for the races were large in number, and the premiums well contested. From the conversation of those around us, it was evident that this society, like many others, was subject to the contest between the race course and the agricultural exhibition proper. From what we heard, it seemed that both parties had settled down in the theory that it was the duty of a board of managers, elected by the stockholders, to so arrange their exhibition as to provide for the gratification of the taste of all, so far as it was possible to do so. Regarding races as a necessary adjunct to our agricultural fairs, we think the visitor to this exhibition will have as little to complain of as at any other fair in the State. Whether a fair can be supported without any racing is yet an unsolved problem, but if it can be done anywhere, it should be in the Quaker counties of Chester, Bucks, and Delaware.

The financial result of the fair was as follows:

Cr.

By cash at gates,	$3,260 65
Single share tickets,	9 60
Season tickets,	171 00
Sale of sutler's stands,	305 00
Tickets sold by railroads,	252 54
Tickets for track stand,	536 96
Entries of trotting horses,	610 00
Entries of exhibitors,	210 00
	$5,355 75

Dr.

To cash paid for music,	$50 00
To cash paid for police,	264 30
To cash paid for repairs,	269 97
To cash paid for printing,	195 43
To cash paid for hay and straw,	81 00
To cash paid for meals for judges, &c.,	76 00
To cash paid for rent of carriage tent,	25 00
To cash paid for stamps, &c.,	17 64
To cash paid for dues National association,	56 00
To cash paid for premiums,	1,674 25
To cash paid for premiums on trotting,	1,460 00
To balance, profit,	1,186 16
	$5,355 75

The Columbia County Fair.—By Chandlee Eves.

The fair grounds belonging to "The Agricultural, Horticultural, and Mechanical Association" of Columbia county comprise an area of about ten acres of as good and suitable land, for holding agricultural fairs upon, as the State of Pennsylvania can supply. They are accessible from all points from the East and West by the Reading railroad, from the North and South by the Lackawanna and Bloomsburg railroad. They are contiguous to the town of Bloomsburg, the county seat. Being thus centerally located, and at a point where trade and business naturally tend, and where good hotel accommodations are always extended to guests and strangers, their value can hardly be over-estimated. Upon these grounds, thus favorably conditioned and located, on the 9th, 10th, 11th, and 12th of October, 1878, the *twenty-third* annual exhibition of our association was held. The opening day was somewhat unfavorable, several smart showers occurring during the afternoon. The second and third days were beautiful, and the exhibition was largely attended.

On Thursday morning, the stock was put on *dress parade* for examination by the various committees. The exhibit was not large, though some very good specimens were shown.

The afternoon of Thursday was mostly occupied by the "Keystone tournament, of Danville." At the close of these exercises, and immediately following the "crowning of the queen of love and beauty and of the first and second maids of honor," Colonel John G. Freeze, of Bloomsburg, made some very instructive and interesting remarks in regard to the grand tournaments of the knights of olden times. At an early hour on Friday, the people gathered at the fair. By ten o'clock the grounds were covered, as it were, by a "sea of up turned faces." The farmers', the county, and the stallion trots came off to-day with more or less interest to those interested and concerned.

The attendance on Saturday was reported not so large as on Friday, many persons not desiring to give countenance to those professional trots. Horse-racing at our county fairs is an evil we ought to remedy in some way. It is a violation of law and good order. How many good honest horses have to be abused by the farmers' indiscreet sons, in trying the speed of their hard worked animals, on account of the influence of this racing at our county fairs. If we cannot hold our fairs without introducing horse-racing, let us abondon them. Let us not thus violate the law of our land, and make ourselves liable to heavy penalties.

Our faith is that *success* is found in doing right, in obeying the law, and that agricultural fairs are not an exception to this rule.

The exhibits of articles of the different classes were not great or grand, yet they were of a character well worthy the notice of the multitudes who came to look upon them.

The Agricultural, Horticultural, and Mechanical Association of Columbia county is continued under a charter from the court of Columbia county, said charter requiring that the receipts of the association shall not exceed $5,000, in any one year.

The receipts for 1878, as set forth by the secretary, are

For 10,600 admission tickets sold,	$2,650 00
For 50 membership tickets sold,	50 00
For percentage on horse race,	98 00
For ground rents,	242 40
For eating-house,	65 00
For seats in amphitheater,	68 30
Total for 1878,	$3,173 79
Total for 1877,	2,458 84
Total for 1876,	2,350 00
Total for 1875,	3,093 87

A bounty of $100 was received annually from the county commissioners until 1864, since which time, on account of a local law, no such bounty has been received, and yet, to-day, our association boasts of a financial standing that, perhaps, is not surpassed by any similar agricultural organization in the State.

Indiana County Fair.—By George W. Hood.

The Indiana county fair grounds are situated within the limits of the borough of West Indiana, adjoining the grounds of the State Normal school and the western experimental farm. They lie on the south side of the Saltsburg road, and are in close proximity to the railroad depot. They embrace, in extent, thirteen and a half acres, and are owned in fee simple by the society. The grounds are considered valuable, and the object of the society is strictly agricultural, intended only for the benefit of the agricultural and mechanical interests of the county.

The Indiana County Agricultural Society was organized January 5, 1855, and held its first annual fair in October of that year. Since then, annual fairs have been held, except in the years 1859 and 1862. The twenty-first annual exhibition of the society was held on the 1st, 2d, 3d, and 4th days of October, 1878. The various departments were well filled, and many of them were of a character decidedly meritorious. The number of entries was largely in excess of any previous year.

The exhibition of horses and cattle was unusually large, and the quality of the stock exceedingly fine. Our farmers have discovered that the raising of good stock costs no more than that of poor. The display of sheep and swine was correspondingly good. In examining the display of sheep, I noticed the largest number of entries was in the South Down or long-wool class. In the display of swine, the largest representations were in the breeds Berkshire and Chester. The exhibition of poultry was larger than that of any previous year. The poultry exhibited by the Indiana Poultry Association was of the choicest breeds, and presented a fine appearance.

The display of farming implements and machinery was excellent. Many of the manufacturing firms of the county were well represented, and displayed large numbers of useful and valuable machinery.

The agricultural department was well represented. The grain and vegetables being especially fine.

The departments devoted to the ladies were not less worthy of note. The display in needle and zephyr work was varied and presented a handsome appearance, while the tables devoted to the culinary art proved the ladies of Indiana county were not strangers to it. The society awards a premium of five dollars for the best loaf of bread, and a like sum for the best two pounds of butter.

The floral stand exhibited a full variety of flowers, well arranged, and was an ornament to the hall.

The weather throughout was very fine. The attendance excelled that of any previous exhibition. The number within the inclosure on Thursday being variously estimated from twelve to fifteen thousand. The receipts were $3,170.

In the year 1876, the grounds were increased from six to thirteen and a half acres. Various improvement were made in that year, by enlarging the main hall, by the erection of machinery hall, the secretary's office, horse stables, cattle pens, sheep pens, and by the enlargment of the track. A debt of some $4,000 was thus contracted, one fourth of which will be liquidated by the proceeds of the last fair, after the payment of expenses and award of premiums. The fairs of Indiana county have become fixed, and from year to year have grown in interest and importance, each and every year producing increased numbers of articles on exhibition and persons in attendance.

Lehigh County Fair.—By J. P. Barnes.

The Lehigh County Agricultural Society was incorporated under the general laws relating to agricultural societies August 13, 1855. Previous to its incorporation, an association of individuals held several agricultural exhibitions. The first of these was held in the fall of 1852, on grounds situate in the borough of Allentown, on the north-east corner of what is termed Fourth and Union streets. These grounds contain an area of about five acres. The fence around these grounds was of primitive construction, and, in order to prevent the people of getting a view of what was on exhibition, a canvass screen was raised around and above this fence to the height of about six feet, which, at the same time, answered the purpose of preventing access in any other way than through the proper entrance.

On this occasion, the articles on exhibition were few, and the premiums amounted to $163 50. County fairs at this time were novelties.

In the latter part of the year 1852, this same association of individuals purchased grounds situate to the north of the limits of the borough. These grounds originally contained eight acres, but were subsequently enlarged by the purchase of additional tracts, and now contain an area of fourteen acres. The grounds are situated in the northern part of the city of Allentown, between Fifth and Sixth streets, and Liberty and Tilghman streets.

These grounds are easy of access from the main thoroughfares of the city by paved sidewalks on Fifth and Sixth streets.

The next fair was held on these grounds, and, in point of display and attendance, was a decided improvement over the first.

Fairs have been held on these grounds every succeeding year up to this present time, excepting the year 1862, during the rebellion, and all these fairs were uniformly a success in point of display, attendance, and financially. The income having, as a general rule, exceeded the expenses.

On these grounds are erected good, substantial, and convenient buildings—a large and commodious hall, two stories in height; the lower story is used for the display of vegetables, fruits, manufactured articles, productions of the dairy and household, cereals, ores, minerals, &c. The upper floor is appropriated to lady's work, works of art, furniture, works of mechanical ingenuity, musical instruments, curiosities, &c.

There is a convenient house, which, during the exhibition, is used as a ticket office, and during the balance of the year is occupied by a family, who have general supervision and charge of the grounds. There is, also, a building for the accommodation of lady awarding committees. Besides these, there is a building which is devoted to the use of the president and other officers of the association. The other structures are a grand stand, at the trial course; poultry shed, horse stables, shedding, &c. In short, all necessary buildings required for advantageously conducting agricultural societies are on these grounds.

The incomes received during the existence of this society, are as follows:

Year.	*Income.*
1852,	$1,200 00
1853,	2,200 00
1854,	2,700 00
1855,	4,000 00
1856,	2,600 00
1857,	2,300 00
1858,	2,479 00
1859,	2,556 00
1860,	2,710 00
1861,	1,883 00
1862,	no fair.
1863,	2,579 00
1864,	2,870 00
1865,	4,946 00
1866,	3,868 00
1867,	$6,352 00
1868,	5,869 00
1869,	6,930 00
1870,	5,118 00
1871,	7,359 00
1872,	8,000 00
1873,	8,862 00
1874,	7,813 00
1875,	7,185 00
1876	4,465 00
1877,	5,781 00
1878,	5,885 00
Which aggregates,	$118,510 00

This amount has all been expended by the society for the purchase of its real estate, the construction of buildings, improvements, repairs, and premiums. The minimum premiums was that of its first year, 1852, $163 50. The maximum, in 1874, $5,559.

The price of a single admission from the first year to 1860, was twelve cents; from 1860 to 1867, fifteen cents; since 1867 it has been twenty-five cents.

The stock of the society numbers seven hundred and twenty-four shares. No one person is permitted to hold more than one share. The stockholders are scattered throughout the county of Lehigh and the adjoining counties, which feature is one of the principal causes of the success of the society. The par value of each share was originally ten dollars, which has been increased from time to time, and now for some time past, been fixed at twenty-five dollars per share. The constitution prohibits the payment of dividends, all receipts not required for repairs and improvements being applied to premiums.

This exhibition of the year 1878, was held on the 24th, 25th, 26th, and 27th days of September. The weather was favorable. Fair weather has been the rule at the time of our exhibitions with very few exceptions.

The display in all the deparments at this exhibition was large and of a character and kind of which Lehigh countians need not be ashamed, and compared favorably, as I know from actual observation, in point of extent and quality with any of the exhibitions of our neighboring counties. In fact I have heard it said that it was the best fair ever held in this county. To say which department excelled would be difficult, as all the departments were filled, and it was exceedingly difficult for the awarding committees to select from among the articles on exhibition the superior in excellence.

The display of horses and cattle was very large. In this department our farmers have made marked improvement. Comparing the cattle exhibited this year with those of former years, one sees that they have paid attention to the breeding and raising of cattle of the superior breeds, and where you once saw only the ordinary stock of cattle and horses, sheep, and swine, you now see the finest grades of both imported and thoroughbreds. The display of poultry was large, of great variety, and very creditable. The same remarks applied to horses and cattle, &c., is also true of this department. The display of cereals, vegetables, fruits, dairy and culinary products generally, was unsurpassed.

The department of ladies' work in particular was very extensive in all its variety, and beautiful in design and finish, consisting of needle-work, wax-work, hair-work, &c., &c., all which shows that the ladies of Lehigh, with their nimble fingers, are not lacking in taste and industry. The floral department was displayed in a canvass inclosure temporarily constructed for the purpose of annual display. The space provided for this purpose was found entirely inadequate.

Many rare and valuable and beautiful flowers and plants were exhibited by florists and amateurs. The place proved to be a great attraction, and was crowded from morning to night.

And further, to be brief, to give a correct idea of the general extent of this exhibition, I will furnish a list of the number of entries and articles displayed, as taken from the books of the society:

The live stock entries were two hundred and thirty-four, consisting of one hundred and seventy-eight horses, one hundred and forty-one head of horned cattle, seventy swine, thirty-four sheep, three hundred and ninety-six fowls, and twenty-eight miscellaneous. The house department, including the flower department, numbers six hundred and twenty-three entries, consisting of four thousand and ninety-two articles, aggregating, with the live stock, one thousand and nineteen entries and forty-eight hundred and ninety-nine articles.

Mercer County Fair—Mercer Couny Agricultural Society.—By L. Bonesteel.

This society held its eleventh annual fair on their new grounds, October 8, 9, and 10. The fair was a grand success in every respect. I am of the opinion that the holding of our fair in October had much to do with our success, as we have held too early for the last three or four years. For a week before the fair entries had been pouring in from all sections.

On the 8th, I was besieged from morning till night, having taken in written entries enough during the day to keep six clerks busy from seven to half past eleven, P. M., filling out cards, and recording. On the 9th a crowd beseiged the office from early morn till noon, all anxious to enter articles for exhibition. Some twenty-one hundred entries were made, the largest ever before recorded in this county.

On the morning of the second day, the weather did not look very favorable, but by nine o'clock, a crowd began to pour into the grounds, and by noon, over five thousand tickets had been sold. In the afternoon it cleared up without any rain, and everything passed off nicely. The last day opened up bright and clear. About nine o'clock the crowd began to pour in from all quarters, and by eleven o'clock, the grounds were one mass of human beings, vehicles, &c. A more intelligent and orderly crowd, never before gathered together on our grounds. A large police force was on duty, but they only had occasion to make but one arrest during the three days.

In the horse department, one hundred and forty-three entries were made. In the cattle department, one hundred and forty-six entries were made, principally, thorough-bred Durhams, and Durhams without pedigree. Also a large number of Devons. The exhibit of oxen and fat cattle was very large. Swine department, fifty-six entries of the most popular breeds, and far ahead of former years. Sheep department, one hundred and eight-five entries, showing most of the improved breeds. One hundred and forty-four coops were entered in the fowl department, being the largest and best exhibit in western Pennsylvania this fall.

All other departments, such as grain, flour, butter, cheese, fruits, agricultural implements, &c., were far ahead of former years. Floral hall was full from top to bottom, many things belonging to classes usually exhibited in the hall, having to be placed outside. The exhibit of potatoes, corn, wheat, &c., was good.

Montgomery County Agricultural Society.—By W. A. Yeakle.

The Montgomery County Agricultural Society is located at the village of Ambler, a station on the North Pennsylvania railroad, about fourteen miles distant from Philadelphia, in the township of Upper Dublin, Montgomery county. The society is a stock company, and own about thirty-four acres, inclosed by a substantial board fence, and known as Ambler Park. The improvements are nearly all new, all of a substantial character, and well adapted to the purposes for which they are intended, with the exception of the building used for farm produce, which is a two story, and should be re-modeled on a ground plan. The country surrounding the grounds is of the best quality in Pennsylvania, and for farm buildings and general improvement in agriculture cannot be excelled anywhere.

The thirtieth annual fair of the society was held at the park this year, commencing September 30, and ending October 5. The attendance was very large throughout the week, and as a pecuniary venture, was quite satisfactory to the stockholders. Good order on the grounds was maintained during the opening.

Favorable weather added much to the success of the fair, it being good all of the week. The agricultural exhibits exceeding any held at this place for years, and particularly in the fine herds of cattle on exhibition. The Holsteins, exhibited by Lukens and Bisson, of Bucks county, were superior, and drew the attention of farmers and others, as also Durham stock by several exhibitors. S. W. Comly exhibited some fine Guernseys, among them two fine bulls, Judge and Lyttleton, that were much admired. Ayrshire cows and one imported bull, Oneida Chief, Holstein stock, by William M. Singerly, claimed particular attention. Other exhibitors added to this department by showing some very fine grades of Durham, Holsteins, Guernseys, &c. Mr. James Money exhibited two fine bulls, Longfellow and Scipio, which not to mention would be doing him injustice for his enterprise and spirit. H. C. Biddle exhibited some fine Alderneys. Altogether, the exhibition of cattle was very fine, probably the best ever held at this place, both as to number and blood.

The display of sheep was not large, but good. T. S. Cooper, of Lehigh county, Pennsylvania, exhibited some good imported stock that claimed attention, and deserves particular mention. S. W. Comly exhibited some fine sheep of Bakewell breed that could not be easily excelled anywhere.

The farmers in the vicinity surrounding Ambler Park are not engaged in sheep raising, with very rare exceptions, as raising hay and grain, making butter and milk for the Philadelphia market, is their chief avocation or livelihood; hence sheep have been neglected. The same may be said of hogs, as they are only raised for domestic use, although some very fine stock in this line were exhibited, such as Chester Whites, Berkshire, and mixed breeds in considerable variety.

Poultry in variety, and fine, claimed considerable attention. In this department B. F. Lewis had the lead, and made a fine display of his different breeds.

The display of agricultural produce was large, and did great credit to this fine farming country, as the wheat, corn, potatoes, were very good and full. In garden produce, the display was fine and reasonably large. The fine arts and home department merit very deserved attention, as much labor was bestowed upon this portion of the fair by the ladies, and by their good taste, in arrangement, drew universal attention.

The floral department is quite a feature with the society, annually, and this is owing to the efficient management by the ladies, in the ingenuous arrangement and taste. Very many rare and valuable plants were on exhibition in this department, and drew large crowds.

The agricultural machinery department was very large and good. In threshers, Heebner & Son, Larzalere & Hulshizer, led the way. Hay wagons, market wagons, carriages, &c., were exhibited by different makers. Syracuse, Oliver, chilled, Conard, and other plows, harrows, wind-mills, corn-shellers, &c., &c., were plentiful, and elicited much praise from farmers.

A new feature at fairs, especially in our State, was held on the last day of the exhibition, namely, a tournament, which made the last day as remunerative as any day of the fair, as the grounds were quite as well filled as any other.

The reputation of the park for trotting was well kept up, and was not excelled by any in eastern Pennsylvania. This is owing, in part, to the excellent track and stables, as well as to the good order and management maintained.

Northumberland County Fair.—By John McFarland.

The fair grounds are reasonably good and convenient for the purpose intended. The attendance was large, estimates varied from two to three thousand people. The first thing that attracted my attention was the exhibit of stock, the display was not only in numbers so large that the stables and stalls were all full and a great many in consequence were tied to the fence, but the quantity was as good as any in middle Pennsylvania, consisting of Durhams and Alderneys. Sheep—Cotswolds, Leicesters, Merinoes, and Southdowns. Hogs—Berkshires, Poland, Chinas, and Chester Whites. The specimens exhibited of each species named were very good, equal to any I have ever seen at any county fair. Of the horse exhibit I did not get as good an examination as I desired. The collection was large and very creditable. The Bashaw stallions, exhibited by Messrs. Doctor George Treon, Barton Runyan, and Allen Kramer, were very creditable. The display of family, matched, and carriage horses exceeded any former exhibition. The show of bread and butter was extensive, and evinced a degree of merit, would, I think, tempt the appetite of an epicure, and, from the display, I should think, in these hard times, that the farmers have, at least, to say nothing more, a feast of the two great staples of America. The exhibit of wheat rivaled any I have ever seen in this or any other fair in the State. The varieties consisted of Clawson, Hix, Mediterranean, and Fultz. The several varieties of each demonstrated that Northumberland county may be placed first upon the list as the banner county for the production of wheat. Corn and potatoes were exhibited in great abundance, and many varieties of each, and all good. The fruit on exhibit was equal to any previous exhibit, particularly the apples, both fall and winter varieties. These varieties reflect great credit upon the nurserymen of the State of New York, as well as upon the gentlemen who had them upon exhibition. The sweet potatoes, pumpkins, squashes, and melons I fail to describe in quantity and size. Beans, lima and bunch, by the peck; Mango peppers by the dozen, if owned by the careful housewife, would gladden the appetite or disposition of any epicure or scold.

The poultry exhibit was not as extensive in numbers as I would have desired, but the Buff Cochins, Partridge Cochins, Leghorns, and Dark Brahmas were all any one could desire.

The ladies' department was not only full, but running over with articles both useful and ornamental.

The culture of bees, I think, must have received considerable attention from the specimens of honey on exhibit, and I think will induce others to follow suit in this vocation of sweets.

The exhibit of agricultural implements, by Datesman & Aungst, reflects great credit to these enterprising gentlemen. The dog churn, on exhibit by Mr. A. Branin, was, I think, well worthy of notice, and many a housewife, in my opinion, (when the dog was on the incline planed, and churn in motion,) coveted the Yankee machine. B. Griffy & Co., of the White Deer woolen factory, of Union county, exhibited a line of their domestic cassimeres, I think excelling anything of the kind in the United States. George Miles had on exhibit a model harrow worthy the attention of any farmer or mechanic. A patent has been applied for.

There were many other exhibits that were very justly deserving special attention, but detail in this particular would be almost endless. The fair, as a whole, reflects great credit upon the industry, enterprise, and progress of the citizens of Northumberland and adjoining counties. The racing was a failure, owing, no doubt, to the society excluding the open-to-all trot. But, in my opinion, Young America is fast enough without the incentive of horse racing. The weather was fine, the order excellent—no doubt the reason for this was that the society allowed no intoxicating drink to be sold upon the grounds to their knowledge.

And now, in conclusion, all classes are invited to stand by the society in all its efforts to promote the agricultural and mechanical interests of the community, and give to the management their influence, and assist to make the fairs a success.

Fair of the Oil Creek Valley Agricultural Association.—By M. C. Beebe.

The fourth annual fair of the Oil Creek Valley Agricultural Association was held at the city of Titusville the 16th, 17th, and 18th days of September.

It was a marked success and an improvement over any of its previous fairs. The grounds of the society consist of twenty-seven acres of land adjoining the Titusville race track, of which the society has the lease for use. The buildings are first-class, and scarcely excelled by any county fair of the State, and this statement includes even the cattle stalls. The grounds are well watered from a spring above them, by means of which the water can be conducted in any direction. The entries of horses were large, and embraced varieties of nine different leading breeds of thorough-breds.

The cattle entries consisted of Durham, Devon, Alderneys and their crosses. The Durhams being the favorite breed, and in excess of all others taken together.

The sheep were of the coarse wool varieties, including Lincoln, Leicester, Cotswold, and one pen of fine wools. Swine—Berkshire, Cheshire, Chester White, Poland China or Magie, and Little Yorks. Of poultry there was a fine display of coops, pure breeds in every one. Grains and vegetables were well represented. Fruit display was limited, owing to the June freeze.

The ladies' department exhibited a marked improvement in the superiority of domestic manufactured articles, while the unusually tasteful display of flowers and pictures excited general commendation.

The mechanical department was well represented by articles of first-class manufacture, not excepting fine carriages of home manufacture.

The society is entirely out of debt. Excellent order prevailed. Innocent amusements were provided in plenty for the multitude—an excellent thing, and good to draw attendance, while no gambling apparatus or drinking saloons were allowed. Dining halls furnished excellent accommodations, and the fair closed with all in good humor and a feeling that the next one should be still better.

The Eighth Annual Exhibition of the Oxford (Chester County) Agricultural Society.

President Isaac Acker; Corresponding Secretary H. L. Brinton, Oxford; Treasurer Dr. J. K. McKissick.

This society was organized in 1870, upon the stock plan, and has issued nine hundred shares of stock at a par value of ten dollars per share. The grounds contain twenty-two acres, which with the improvements are valued at twelve thousand dollars. Like most other organizations of a similar nature, this society has had its financial difficulties, but under its present energetic and practical administration is in a fair way to pay off its floating debts, and enter a sphere of usefulness in competition with the older society in the same county. But few societies in the State have a more ample or productive field from which to draw its exhibits: western Chester county, south-eastern Lancaster, and the north-western counties of Maryland all contribute, not only to the management and support of the society, but also by the quite as important item of exhibits, are doing much to place it on a firm foundation.

Financially, morally, and practically the eighth annual exhibition, held September 25, 26, and 27 was a success.

On Thursday (the second day of the fair) about twenty-eight hundred people were present; but, on Friday, which is always the main day, the attendance was increased to from eight thousand to ten thousand. President Acker and his secretaries, Brinton, Stubbs, and Passmore, are to be congratulated on the general good order and good humor preserved during the whole fair.

In the main building, under the special charge of T. T. Woollens, the ladies fully maintained their former displays of household products, and all the sub-departments were well taken care of. The children's department (a speciality of this society) was well filled, and attracted much interest.

The display of fruit was large and varied, two of the exhibitors, each showing over fifty varieties, and shows the adaptability of this section of the State for this growing branch of agricultural industry. We venture the prediction that, in ten years more, the section represented by this society will be noted for its exports of fruits to Philadelphia and Baltimore markets.

In the display of live stock, this exhibition was fully up to that of former years. The display of agricultural implements was not as extensive as in some former years, but all classes of implements were well represented. A shed of some kind, for the accommodation of this class of exhibitors, is much needed. The floral display was fine, and much of its beauty is to be attributed to the displays of Rev. S. Dickey, J. Cowan, and Speakman & Son. Specimens of industrial drawing, by Rebecca J. Conard, attracted special attention.

We would commend the plan adopted by this society, of closing their exhibition on Friday, so as to allow the exhibitors one full day in which to remove their goods. This does away with much of the confusion incident to Saturday evening, when the exhibition closes on that day. We would condemn the admission of side shows, prize package sellers, and peddlers as unnecessary, and not warranted by the requirements of an agricultural society.

Somerset County Fair.—By Hon. C. C. Musselman.

As this is, perhaps, the first report upon this subject from our county, a short history of our fairs may not be out of place. Through the efforts of some of the leading men of our county, of all occupations and professions, the "Agricultural Society of Somerset County" was organized, and the first fair was held in the town of Somerset, in the year 1852.

In 1857, our fair was a complete failure on account of bad weather, raining and muddy, and financially we were *swamped*. The novelty of the thing was somewhat worn, the financial condition of the society at low ebb, with the political affairs of our country at high tide, ending in our late civil war. Somerset being a border county, our fair grounds were given up to our soldiers, as a place of rendezvous, during the great rebellion.

It was not until 1873 that the Agricultural Society of Somerset County was again revived and chartered, with the following officers: President, C. C. Musselman; vice president, John M. Holderbaum; secretaries, F. J. Kooser and J. J. Haffman; treasurer, Henry F. Schell; superintendent, Josiah Shaffer, Esquire.

A few successful fairs were held, after which additional ground was purchased, improvements made, a heavy debt contracted in the middle of our present financial crisis. Then followed two almost total failures in our exhibitions, in 1876 and 1877. Debts were contracted, premiums offered without any money to pay them. One such failure would be almost enough to send a society beyond the hope of resurrection, but here were two failures in succession.

We have ten acres inclosed in our fair ground, almost square, with stalls on three sides, abundance of water, a good track, one third of a mile long, three principal buildings, a floral hall, or ladies' department, an agricultural and mechanical department, a music and speaker's stand, one building for offices, several for refreshments, &c.

Our fair was held on the 24th, 25th, and 26th of September. The first, and part of the second day, we had gloomy forebodings, cold and raining. About noon the second day it cleared off, and everything was cheerful and happy. We would say that while some of the departments were not as full as they should have been, the articles on exhibition were good. The ladies' and children's department were elegant. The articles displayed by our young friends were beautiful, useful, and ornamental. Taking everything into consideration, our fair was a complete success.

We have added a new feature to our dairy farming, that of cheese and butter making, on the factory system. It was admired by all, and added much to the interest of our fair.

Ten hundred entries were made. The exact amount of money taken in I have not learned, but enough to pay all the premiums and expenses, and some of the old debts.

Addresses were delivered, on the second day, by Governor John F. Hartranft and Hon. J. M. Kirkpatrick, of Pittsburgh. These able and interesting speakers, alone, were worth attending the fair, to say nothing of the Odd Fellows' procession, military display, the addresses of welcome to the Odd Fellows, by Rev. J. K. Lavan, and the able answer by Rev. J. J. McEllier, winding up the last day with a grand tournament, foot races, apple picking, &c., &c.

Here let me say, that our constitution and by-laws prohibit all manner of gambling, horse-racing, side shows, and chance games. So far we have kept comparatively clear from these thinge, but the pressure for "a little nonsense now and then," can scarcely be resisted.

While some of our agricultural fairs have been monopolized by horse races, side shows, chance games, I frankly admit that we are gravitating, slowly but stubbornly, inch by inch, in the same direction, and away from the main feature of an agricultural and mechanical fair. With very few exceptions, the great preponderance is still on the side of the useful, the good, and the noble.

Others, again, object because public-spirited men in towns, such as lawyers, doctors, merchants, bankers, &c., take the lead in starting and keeping up these societies. This is very ungenerous, to say the least, for some of these very persons, who make objections, will reside in the county all their lives, and never think of starting, or helping to start, or encourage agricultural fairs. The truth is, this kind of farmers will do nothing to raise the standard of their profession. The attention that this important pursuit is receiving is very much due to the liberality and enterprise of men in other callings.

Susquehanna County Agricultural Society Fair at Montrose—By J. C. Morris.

The twenty-third annual fair of this society was held on their fair grounds September 25 and 26, 1878. This annual exhibition is regarded by the people with much interest, and especially by the young people as a holiday. The society is incorporated ; owning the fair grounds; is established on a firm basis; is always prosperous, and from its foundation has never been allowed to be in debt. The buildings are well adapted to their purpose, and there are ample accommodations for large entries of stock, and for the exhibition of fruit, seeds, vegetables, dairy products, dairy and farm implements, and domestic manufactures. There is a track within the inclosure, of a third of a mile in extent, but there is no premium offered for any race faster than a walk. The exhibition just closed was, as usual, a success, both in display and attendance. In the horse department, there were numerous fine animals. Mr. L. T. Birchard's thorough-bred, is a beautiful horse, of fine action. Mr. McIneirney had on exhibition a large, fine horse, bred from a Clydesdale, on a thorough-bred mare; a horse of good spirit, fine points, and great strength. Mr. R. S. Searle had his Morgan stallion on the grounds, a great little horse, that has proved himself the getter of some of the finest horses that are owned in the county, and some that have been sold out of it. There were several pairs of matched horses on exhibition; also, single driving horses, with the usual number of mares and colts, all an improvement upon those of passed years. Master Carmalt Morris, with his thorough-bred Shetland ponies and his tandem team attracted much attention.

The show of Short-Horns was large. Three very fine herds, besides many single animals. Mr. C. A. Summers, of New Milford, took the herd premium. He is a young breeder, and is to be congratulated on his success in selecting his breeding stock. Mr. J. E. Carmalt showed a part of his herd, that took the herd premium at the New York State Fair in 1875, with some of the young stock that he has since raised. All fine. Mr. William H. Jessup had on exhibition some capital animals, as the premium list shows. I do not think that either of these breeders can be beaten in the State for fine Short-Horns.

There were also several herds of Devons, with a number of single animals, as purely bred, and fine as any in the United States. Messrs. D. and J. Bankel took the herd premium, with the same herd that carried off the herd premium at the New York State fair, last month. Messrs. William H. Jones, E. T. Tiffany, and O. H. Summers showed fine herds, and took a portion of the premiums on single animals. Messrs. C. Byrne, P. Byrne, and J. T. Butterfield, each showed fine herds of Ayrshires. Mr. C. Byrne took the herd premium with his fine dairy of pure-bred registered Ayrshires. A portion of them imported from Scotland. Each of these breeders took premiums on single animals.

A couple of herds of Alderneys were on exhibition—some good-looking animals of their kind. No fancy animals requiring other than a passing remark.

The show of oxen and steers was really very fine, as it always is here, most of them being bred from a Devon bull on grade Short-Horn cows, and are large finely matched red cattle. There is no team the farmer can use, that pays so well as a good handsome yoke of Devon cattle. They are pleasing to the eye, and will do as much work as any pair of horses, with one half the expense of food, and never losing time for want of a harness-maker or blacksmith.

Several pens of sheep: Cotswolds, South downs, and Merinoes. Fine specimens of each of the different breeds were exhibited.

Hogs of different breeds: Berkshires, Essex, Chester Whites, and Poland China were on exhibition. Mr. L. T. Birchard, is one of our noted breeders of the Essex.

Butter and cheese, for which this county is celebrated, made a large exhibition.

Farming implements were shown from the Susquehanna county Agricultural works, located in Montrose. There is no need for our farmers to go out of the county, for their farming implements. These tools are of the latest improvements, and the work well done.

Of carriages and wagons made in the county, there was a fine display of the different kinds used in the country. Messrs. Jackson, Osterhout, and Chamberlain took the money premiums.

The show of domestic manufactures was full and large, also that of fancy articles, showing that our ladies, the elderly with their patch-work and knitting, and the younger with their embroidery and lace-work, all appreciate the fair, and are interested in its successful exhibition, and when the ladies are interested, we all know anything must succeed.

You may think my descriptions rather glowing, but you will find on reference to the premium lists of the State fair held at Scranton in 1870 and 1871, that Susquehanna county carried off nearly all the premiums. In the language of some of the clerks, it was a "premium smasher," and it still sustains its reputation.

Fair of the West Pennsylvania Agricultural Society—By Andrew Robinsou.

The West Pennsyluania Agricultural Society was first organized under the corporate name of the Central Agricultural Society, in January, 1871. The board of directors purchased fourteen acres of land, on which they held their exhibitions. Finding that this was not sufficiently large to accommodate visitors and exhibitors, the managers, sometime during the winter of 1874, purchased twenty-seven acres, in addition to the fourteen acres, making the whole number of acres now forty-one. About the same time, the corporate name was, on application, changed from the Central to West Pennsylvania Agricultural Society, of Mercer, Pennsylvania.

The improvements consist of a dwelling-house and barn, that cost $2,700; two dining-halls, two fine exhibition-halls, besides stationary restaurant stands, covered sheds and building for live stock, and a half-mile track.

The total cost of the ground and improvements is about $22,000. The capital stock (limited) is $10,000. About $7,500 of said stock has been subscribed and paid into the treasury. The society has paid on the improvements and grounds, (after paying expenses and premiums,) about $13,400 since its organization. Consequently, the association is yet indebted for land and improvements, $8,600. Last year the society cleared about $2,000. The past fair came on the 9th, 10th, 11th, and 12th of September, 1878. It was the time of the great flood in western Pennsylvania; yet with all the society cleared about $1,000 to $1,200, after paying expenses and premiums. If the weather had been fair would, easily have cleared $2,000 out of receipts.

The society pays out for premiums annually, about $1,800, divided about as follows: live stock, about $600; farm products, including fruits, $500;

manufactories, $200; domestic manufactures and products, $300; horses entered for trial of speed, $200.

The annual meeting of stockholders is held on the last Tuesday of January, at which time officers are elected for the ensuing year.

The association will not have to expend much money for a number of years to come, but will use the surplus annually towards liquidating the debt. As soon as the debt is removed we will be in good shape to give much larger premiums and to put more improvements on our grounds. We had this year a very fine display of horses, cattle, sheep, and hogs. Our poultry was very fine. The agricultural products were not as good as some years. Our fair was most too soon; but taking all in all we had a very good fair.

York County Agricultural Society's Fair of 1878.

The old song of a rainy day in fair time was changed to a more cheerful tune at the twenty-first annual exhibition of the society, which commenced on the 1st and closed on the 4th of October, 1878. The weather all the time was agreeably pleasant, the exhibition never better, the attendance unusually large, and financially the fair was a success. The receipts from entrance tickets sold was a little over $1,000 in excess of last year; there was a gain in receipts from the grand stand, but a loss in the sale of booths and privileges. The trotting expenses were $345, (not so much as last year,) and the total amount of premiums awarded, including trotting, is $1,804. The receipts from all sources run over $6,000, and after paying all expenses, will leave a convenient balance for a rainy day, which might happen next fair time. Everything passed off to the entire satisfaction of the managers, and we trust exhibitors and visitors were alike gratified.

The exhibition of stock and articles was larger in number and better in merit than we remember of in any former year, thus going to prove that "the objects of the society, to foster and improve agriculture, horticulture, and the domestic and household arts," are surely progressing, from year to year, in York county.

Here is what our neighbors say of us: At a meeting of the Lancaster County Agricultural Society, held in the city of Lancaster on the 7th of October last, Mr. H. M. Engle, who was a judge at our fair, said, "York and Berks have successful exhibitions every year;" and Mr. Calvin Cooper said "he had always been loth to give any encouragement to fairs, but it was probably because they have been so badly managed. He saw the fair at York, at which he was one of the judges. They look forward to it, as a holiday, for months before the time. They have sociability, no drunkenness, a little horse racing, and the best of stock and produce." Thus it will be observed that our society is noticed abroad, not only for having successful exhibitions, but for good order, and the best of stock, produce, and implements at our fairs; and the managers hold out the promise that few, if any, of the many thousands who attend our annual fairs will go away without receiving some benefit directly or indirectly.

The managers last summer erected four turn-stiles, purchased from the Philadelphia Permanent Exhibition Company, and of the number of persons in attendance during the four days of the fair the turn-stiles registered forty-eight thousand eight hundred and eighty-five, which added to those who entered the grounds in carriages and other ways of ingress, would, according to our estimate, foot up a grand total of between fifty and sixty thousand persons as having visited the fair during its continuance. But as the dollar season ticket, under our rules, admits the father, mother, and children of the family under age, and is good during the fair, it must be conceded that some families are very numerous, perhaps running back into generations, and as many of them pass in and out of the grounds frequently during each day, which will account for the large number registered by the turn-stiles. We do not believe that at any one time there was over sixteen thousand persons in attendance. Nearly eight thousand persons passed through the twenty-five cents turn-stile, which was entirely satisfactory to the management in adopting the turn-stiles.

We think the dollar system of admittance should be changed, but how to do it, and still keep on good terms with the many warm friends of the society, has often been discussed in the managers meetings without arriving at any settled conclusion. We therefore recommend that at an early day a meeting of the life and annual members be called, to consider this subject, as well as our system of entering articles and having them judged, and other matters of importance to the society and agricultural interests of the county.

W. S. ROLAND, *President.*

A. H. GLATZ, *Secretary.*

THE RESULT OF FIVE YEARS' EXPERIMENT IN WHEAT CULTURE.

By JOHN M. HEIGES, *York, Pa.*

Secretary Board of Agriculture:

DEAR SIR: I can best answer yours of September 9 by claiming that in this age of enterprise and thought, when science is casting so much light upon the operations of men, and when the study of the best and most profitable modes of performing the work of the world is becoming more essentially necessary to the production of successful results, the farmer is especially called upon to bestow industrious thought, as well as labor, upon the work which he is daily called upon to perform. He should understand his soil, he should also have a knowledge of the nature of the seeds he sows and plants, how they germinate, how they grow, how they ripen, and how and why they produce fruit.

The thought and conviction that frequent plowing and stirring of the soil is important to its fertility, because the earth itself is a set of mouths and lungs which feed upon the natural elements of the air, and imbibe its moisture, light, and heat, induces him to the performance of the work in the promotion of his own interest.

Believing that a much larger yield of wheat per acre could be had by sowing on some other plan than with the drill, and that by sowing wheat in broader rows, and cultivating the spaces between the rows the same as corn and potatoes, would add largely to the yield, I asked myself this question: Would it not pay to cultivate wheat?

In the summer of 1872, I manured three acres of land, plowed it about nine inches deep about the 10th of August; left it lie until the 20th of September, when I plowed it the second time about ten inches deep, and harrowed it thoroughly. I then measured off a sixth of an acre, and used a common garden hoe to make scores about five inches wide, as level on the bottom as possible. I left a space of six inches wide between the scores. I sowed on said plot eight quarts of Fultz wheat, on the 25th day of September, and covered with a rake. In the spring of 1873, I hoed the spaces between the wheat, once in April and once in the first week in May; sowed clover seed after the last hoeing, and had a good catch of clover. When the wheat came into heads, I found the heads much larger than those of the same variety, sown on the same day on adjoining ground, of the same kind of soil, and the whole treated alike as to manuring and plowing. I thrashed from the plot eight bushels, or nearly double the quantity to the acre procured from the remainder of the three acres. (I always plow twice for wheat, and never less than ten inches deep.) In the fall of 1873, I sowed all my wheat on the same principle, making the scores, (with a double mold board cultivator,) about eight inches wide, leaving the ridges between the scores about ten inches wide; sowed broadcast and harrowed lengthways once, then followed with a drag to level the ground. In the spring of 1874, I cultivated a plot of one acre. I hoed part of the plot once, part twice, and the remainder of the plot three times. On the part hoed once, the heads were larger than on adjoining plot, which I did not hoe; on the part hoed twice, the heads were even still larger, and on the part hoed three times the heads were larger yet; some of the heads measuring nearly six inches in length, satisfying me that it paid to hoe three times. The yield from the plot hoed was fifty-five bushels. From the remainder of the field not cultivated the yield was about twenty-three bushels per acre. I did not sow the acre I hoed with grass seed. The remainder of the field was sowed with clover and timothy. In the fall of 1874, I again put my crop of wheat in on the same principle. Some of it I sowed to grass, and did not cultivate in the spring. I found the heads on that part which I had not cultivated were larger than the heads of the same variety of wheat put in with the drill, but nothing like as large as the heads on the remainder of the field which I had cultivated. I have a lot of ground containing twenty-nine square yards—less than the third of an acre—on which I sowed fifteen quarts of a new variety of wheat in 1873. I cultivated the lot twice in the spring of 1874. The yield from that was sixteen and one fourth bushels, or about forty-nine and two third bushels to the acre. I have sowed the same lot to wheat every year since 1873, and had about the same yield, except the crop sowed in the fall of 1877. I had received from the Agricultural Department at Washington, D. C., several packages of wheat, viz: four pounds of "Arnold's Gold Medal" and four pounds of "Golden Stem." I sowed one half of the lot with these two varieties and the other half with one of my own varieties. The result was an entire failure, the whole lodging before it came into head. Consequently, it did not fill, and I did not get a half bushel of wheat from the whole lot. I cannot account for the lodging, unless the too frequent sowing to wheat had exhausted the silica from the soil. In the fall of 1874, I procured one pound of wheat imported from Europe, some person having brought the seed from Germany. I sowed it on the fifty sixth part of an acre. I hoed it once in April, 1875, and once again on the 3d day of June. At each hoeing I scattered phosphate of lime and wood ashes between the wheat rows before hoeing. I thrashed from the product of that one pound of seed one bushel nine quarts and a pint of good wheat, or at the rate of seventy-one bushels to the acre. The plot was measured by Messrs. Hoffheins and

SAMPLE SECTION OF CHAMPION AMBER WHEAT CULTIVATED BY
JOHN M. HEIGES, OF YORK, PENNSYLVANIA.

Smyser, both managers of the York County Agricultural Society. I thrashed it in the barn of Mr. Herman Hoke, cleaned it in his presence, he also being a manager of the above society. I then brought John Evans, Esq., (now deceased,) president, and George A. Heckert, Esq., treasurer of said society, and measured the grain in the presence of the last named gentlemen.

In the fall of 1875 I sowed six acres in the same way, except that I made the scores twelve inches wide, and left the spaces for cultivation ten inches wide, thereby utilizing more ground for the seed than heretofore.

The illustration is from a photograph taken from a field of wheat sown in 1875, that yielded fifty-one bushels and seven pounds to the acre in 1876, the field having had but one cultivation in the spring.

In the fall of 1876 I sowed the same six acres with wheat again, cultivated some of it once and part of it twice, the yield from the six acres was three hundred and fifteen and one third bushels, over fifty two and a half bushels to the acre.

In the fall of 1877 I put my wheat out on the same plan. I sowed twenty-one varieties, most of which proved worthless, but from the "German, or Champion Amber" variety, I threshed fifty-seven bushels and six pounds from the acre this season.

I am well satisfied that the advantages gained by sowing and cultivating wheat on this mode, are: 1. More space occupied by the seed, giving the plant a better chance to take root, each grain occupying a separate space, and not confined in the V shaped furrow, as with the drill, all the seed being scattered on a level bottom, giving each stalk an equal chance, so that there are no short stalks and no small heads.

2. Cultivation breaks the hard crust caused by the snow and rain during the winter months, thereby opening the mouths and lungs of the earth to the natural influences of air, warmth, and moisture, when the young plant seems to need such influences, the growing of the wheat in larger masses, so that it is more difficult for the frost to uproot, and the better settling of the wheat if lifted by the frost.

3. The space left between the wheat for cultivation, leaves an opening for air and sun-light.

4. It seems to protect itself better than when sowed with the drill, as I have not had any wheat winter-killed since I have sowed my wheat on this plan, when, a few years ago, some of my neighbors' wheat was nearly all frozen out or winter-killed.

I always make the scores north and south, if the nature of the land permits, thereby having the rays of the sun equally upon each row of wheat.

The extra cost of sowing and cultivating wheat on this mode is not over two dollars per acre more than with the drill.

I have now given you, as near as I can, the mode of sowing, and the results of my experiments in wheat culture since 1872. My yield in the last six years has not been less than forty-eight bushels to the acre when sowed on the foregoing plan and cultivated. These experiments have fully convinced me that the method I have devised is more certain of insuring a large yield than any other I have seen or read of, for the reason that I utilize fifty-four per cent. of the soil for the wheat to stand upon.

REPORT OF C. B. MICHENER, VETERINARY SURGEON OF THE BOARD, ON HOG CHOLERA IN BEDFORD COUNTY.

THOMAS J. EDGE, *Secretary Pennsylvania Board of Agriculture:*

By your direction I visited Bedford county, Pa., on 28th October, 1878, for the purpose of investigating "hog cholera," and suggesting such means of prevention or cure as I might be led to think advisable. From what I can learn, "hog cholera" has existed in this neighborhood for twelve to fifteen years; that it mostly makes its appearance at or about harvest, and increases until cold weather. Dry summers favor its propagation, as the poison becomes dried, and can then be carried further by favorable winds and other media. "Hog cholera" is known during all seasons of the year, but principally during the fall. The whole history of this malady, plainly and positively indicates it to be an *infectious* disease, having a *specific* poision, which can be, likewise, transmitted by inoculation. Pigs from three to six months old are the principal ones affected by *this* outbreak. The first lot of infected pigs visited were those of Edward Van Hartley, four miles from Bedford, in Snake Spring township. This gentleman has lost about twenty pigs, since harvest, from "cholera." Four are sick at present. He has them removed from his healthy pigs, and placed in a temporary pen, three to four hundred yards from his other hogs.

The symptoms presented are: emaciation, shivering, loss of appetite, a persistence of laying on the belly, and a desire to hide or cover themselves in the leaves. The skin shows a dark yellow color, but not mottled, and covered with purple petechiæ, as is usual. On being roused up, by placing my hand on them, they evince pain, and squeal violently. Their movements are unsteady, stiff, and decidedly weak in hind extremities. From two there is a muco-purulent discharge from eyes and nose. In all these cases, on being driven up, a hard, persistent coughing is induced. Breathing is accelerated and laborious. One, which has a diarrhœa, suffers palpitation of the heart, and has a temperature of one hundred and three degrees, Fahrenheit. The owner kindly consented to have one of these pigs killed. The temperature, as shown in the rectum of this pig, was one hundred and five and one fifth degrees Fahrenheit.

POST MORTEM, No. 1.—Boar pig, four months old, of medium size, and very thin in flesh. Been sick five days. Was killed by knocking in head with an ax.

Examined immediately after death. The abdomen presented, externally, a general and diffuse dark redness, but no petechial spots. The eyes were swollen and emitted a muco-purulent discharge. The trachae and bronchi were partially filled with a frothy mucus. Anterior lobe of the right lung is hepatized. The blood is thin, black, and partly disorganized. Heart is healthy. From two to three ounces of dropsical effusion escaped on opening the abdomen. The stomach and bowels were of a slight red externally, while internally the stomach was healthy; and the bowels only revealing red spots or lines, and were filled with hardened fæces to which patches of the mucous membrane adhered. The bladder was partially filled with healthy urine. The kidneys were healthy, as was, also, the liver, spleen, and pancreas. The bile was of a normal appearance.

POST MORTEM, NO. 2—PROPERTY OF JOHN G. VAN HARTLEY, ADJOINING LANDS WITH EDWARD VAN HARTLEY.—*Case:* sow; three years old, large, in good condition when taken sick, on Thursday, October 24. Died on Monday, October 28, very much emaciated. Was unable to get up after first day; refused all food or drink; body is not at all tympanitic; rigor mortis, well marked. On the abdomen, axilla, thigh, and underneath the jaws, purple spots are seen. Some of these have passed through the stages of vesication and pustulation, and are covered with hard, dry scabs. A thin glairy discharge escapes from eyes and nose. About four ounces of aqueous fluid contained in abdominal cavity. The stomach presented only a very slight redness toward its pyloric orifice, and was filled with food. The small intestines, from the stomach to the termination at the ileo-caecal valve, were denuded of their mucous lining, and contained a fluid of the consistency of bile, and yellow in color. In the large bowels there were bands of purple infiltrations and some small ulcerations. The contents of the large bowels was dark and hard. The lungs were healthy; the windpipe free from any mucous secretion. The blood was black and partly coagulated; the heart, pleura, pericardium, and peritoneum were spotted with numerous petechial points. The bladder, kidneys, spleen, liver, and pancreas all healthy.

POST MORTEM, NO. 3—OWNED BY JOHN VAN HARTLEY.—*Case:* barrow; eight months old; small for its age, but fat. Skin shows lesions, same as No. 2. Not tympanitic; rigor mortis complete. Bowels have been very loose. Had been dead two days, and was very fœtid. The lungs were very much diseased, showing hepatization and abscesses. The bowels same as preceeding, with the exception of the contents of large bowels being liquid, and the mucous lining more generally effaced. Other organs of the body are healthy.

POST MORTEM NO. 4. OWNER, JOHN G. VAN HARTLEY.—*Case:* sow pig; eight months old; large for age; and was in good condition. Is slightly tympanitic; rigor mortis set in; no discharge from mouth, eyes, nose, or anus; surface of skin not discolored; the bowels are filled with hard black fæces, which are coated with pieces of mucous membrane; the lungs are infiltrated with fibrinous deposits, and the bronchii contain bloody froth. The heart and liver reveal traces of fatty degeneration. Blood is clotted and black. Other organs of the body do not appear diseased.

This gentleman has a barrow two and one half years old, that is sick. Has been with other hogs until this morning, when he was put out of the pen into the yard immediately joining. The symptoms are the same as those noted in cases of Edward Van Hartley. Diarrhœa exists. Temperature, one hundred and two and one fifth degree Fahrenheit. A barking cough is followed by palpitation ofthe heart, which subsides some minutes after the animal lies down. Died the following morning.

POST MORTEM, NO. 5—PROPERTY OF SOLOMON F. DIEHL.—*Case:* Sow three years old; large, and thin in flesh. Was in good order when taken sick. Was suckling pigs, which were taken from her one or two days previous to her death. The body was tympanitic and stiffened. Skin on abdomen, legs, throat, and ears of a purple color. In some places the petechial spots were black, and had become confluent, with a tendency to slough. End of vulva was scarlet, with purple petechiæ on lips of same. Eyes are sunken, emitting a sanious fluid. Conjunctiva contains peticulæ; bloody discharge from nose and anus. Bowels very loose; purple or darker petechiæ on external coat of stomach and bowels; also on heart, pericardium and peritoneum. The mucous lining of bowels entirely destroyed from the stomach to rectum. Intestinal contents, thin, darker than usual, and very offensive. Liver very dark and friable. Spleen very much congested, and black in color. Pancreas, healthy, as were the lungs, heart, kidneys, and bladder.

POST MORTEM, NO. 6—PROPERTY OF ADAM SHAFFER.—*Case:* Sow pig; three months old, small for age. In good condition. Been dead six to eight hours. Is stiff, and somewhat bloated. Skin is dark red in lines and patches. Eyes and nose emitting a muco; purulent discharge. Lungs slightly congested and infiltrated. The lungs, heart, and stomach are all attached to the diaphragm, and the peritoneum to the abdominal walls, by fibrinous adhesions. The abdominal and thoracic cavities contain some serous exudations. The fæcal matter is very thin, of a dark yellow color, and not very offensive. Stomach, in pyloric portion, is extensively ulcerated. Ulcerations and extravasated patches of blood, to be seen from stomach to colon. The kidneys, pancreas, and liver are healthy. The spleen is congested, and its pulp is easily broken down. The coats of the bladder are from five to six times their natural thickness. The mucous lining is reddened, and the contained urine is tinged with blood. The brain and the enveloping membranes are healthy. There are about twelve pigs of the same age affected on this farm. We were able to catch but one, as they were running out, and its temperature was one hundred and three and three fifths degrees Fahrenheit. We next visited the farm of Joseph Mortimore, who has had four cases in full grown hogs. Three of these are recovering without any treatment, while the other is almost dead. This hog was steadily improving, but has had a relapse from some cause. I strongly suspected that the ulcerations had involved the serous coat of the bowels to that extent as to cause perforation. The temperature was one hundred and seven and one fifth degrees Fahrenheit, and a speedy death was prognosticated. Did not have the opportunity, however, to return to hold a post mortem, which would have been, owing to the complications, of unusual interest.

POST MORTEM, NO. 7.—Boar pig; age, six weeks; size, medium and thin in flesh; been dead twelve hours; not tympanitic; rigor mortis well marked; surface of body showing separate and confluent petechiae; eyes, nose, and anus discharging a sanious fluid; diarrhœa has existed; the muscular tissue is, throughout, soft and flabby, and contains reddened spots; the lungs are healthy; the heart is flabby and empty, and shows slight fatty degeneration; endocardium and pericardium are marked with red and purple spots; diaphragm studded with vascular points and lines; liver almost healthy in aspect; gall of normal color, consistence, and quantity; spleen is congested; pancreas healthy; external surface of stomach and bowels dotted, and purple in lines and bands; in places for one foot to eighteen inches, the entire bowel is purple. Like the preceding, in this, there is almost complete loss of mucous lining of the bowels. The large Peyerian patch is ulcerated during its entire length; the pyloric portion of the stomach is ulcerated and studded with tubercles; the contents of the bowels was very thin, of a pale yellow color, and quite offensive; the large bowels showed tubercular deposits; the kidneys are darker than usual; bladder is healthy, but the urine is slightly bloody.

From these *post mortem* lesions, and from the history of the disease, we infer that we have to deal with a *blood* disease, which owes its origin to an atmospheric poison, and which poison shows its local effects, in intensity and constancy upon—first, the bowels, and second, the lungs. I had thought of applying the name of infectious pneumo-gastro-enteritis, as a substitute for the misnomer "hog cholera," but since the *gastric* lesions are the least common, and not, by any means, always present, probably the best name is that adopted by Dr. Klein, *i. e.*, "contagious pneumo-enteritis."

This disease does not depend upon the particular kind or quantity of food consumed, upon the character or nature of the soil, nor any peculiarities of breeding; but, like yellow fever and cerebro-spinal meningitis in man, must be attributed to the presence of a *specific* poison in the atmosphere. Certain foods may operate, from the extreme sensibility of the bowels, to render the attacks more violent and fatal, but these consequences should never be confounded with this special virus, which is, *per se*, in every instance, the cause of "hog cholera." It does not appear necessary for me to go through a long and precise description of the history, symptoms, &c., &c., of this disease, as the reports of the Department of Agriculture contain this in *extenso*.

The first thing to be appreciated by those who suffer by this malady is the fact that this is an infectious disease, due to a specific poison, which is transmitted from place to place, and from herd to herd, through the media of the atmosphere; by the clothes and implements employed by man; in the hair of dogs that have eaten carcasses which were affected with cholera; in the plumage of birds, (buzzards and ravens principally,) and freuqently by streams of matter into which infected hogs have droped their fæces.

Allowing the sick to herd with the well, of course, is a fertile source of the contagion. It is estimated that the germs of this poison can be transmitted from the emanations arising from an unburied carcass through the atmosphere, and cause contagion at from one half to one mile. Appreciating then the character of the disease, and its mode of proрogation, what are the indications for treatment, both preventive and curative? The answer is so pertinent that it seems like a waste of words to hint, even that legislation is necessary t oinduce men to conform to these indications. Yet such is the case. As the disease is now treated. the sick are, in most instances, allowed to run with the healthy; they eat from the same trough; they occupy the same litter; they breathe the same air. The emanations from the fæces of the sick (probably the most fertile source of the contagion) are breathed in daily by the well; the carcasses of those which have succumbed to this affection are dragged out and left lie on top of ground, and often on high points of land where the wind has every possible chance to disseminate these poisonous germs. As a rule, no disinfectants are employed. So long as this treatment is pursued, hog cholera will exist and spread.

As soon as one death has chronicled the existence of this disease in a herd, there should be a vigilant watch kept on all the rest. The pens should be, at once, thoroughly cleaned by white-washing the sides and scrubbing the floors, and applying crude carbolic acid or chloride of lime on the trough, floor, and on the manure pit. A bottle of carbolic acid, with the cork removed, should be hung up in the pen. If any new cases develop, remove, immediately, to as great a distance as possible, from the well, and place the sick in charge of a person who is not to have, on any consideration, access to the healthy. Bury or burn all dead bodies without delay. Be profuse in the application of disinfectants in and about the pens of the sick.

A vast number of preventive "remedies" have been heralded, but I believe them generally to posssess little or no virtues. The best, probably, of all these is charcoal. It posseses the virtues of a disinfectant to a high degree, and is readily eaten by hogs. Sulphur, antimony, copperas, &c.,

&c., have been used, and, although tonics, like sulp: iron, may fortify the system to a certain extent against the disease, they can have little to do with eradicating the poison.

Insolation, disinfection, and a proper and immediate disposal of all dead bodies are the *sine-quanons* toward breaking up and exterminating this disease. If these measures will not be followed without legislation, then pass laws, and appoint competent men to enforce them, and reasonably hope for a deliverance from this evil.

So far ascurative treatment is concerned it seems to me to be impracticable to carry it out; unless we had a specific. All that need to be done is, I think, to isolate the sick in well-ventilated, well-littered, and thoroughly disinfected stables; if the bowels are costive, to give an oleaginous purgative; if a diarrhoea is persistent, to give an astringrnt; to keep before them a charred log; to give them lime water with their milk, and to meet special developments as they arise. A course of vegetable and mineral tonics will be found advantageous during convalescence.

Health is so slow in being resumed, in most cases, that it is a question to decide whether there is not more economy in killing the sick, as soon as the symptoms are well marked, than in treating them through a convalescence which sometimes extends to months.

The government must appreciate the necessity of these preventive means, and grant sufficient appropriations to effectually carry them out, before much good can result, and these enzootics and epizootics be held in check.

CHARLES B. MICHENER, D. V. S.,
Veterinary Surgeon of Pennsylvania State Board of Agriculture.

INSECTS INJURIOUS TO THE CABBAGE PLANT.

By Prof. J. STAUFFER, *Lancaster*, *Pa.*

[NOTE BY THE SECRETARY.—Numerous inquires having been received from correspondents, relative to the habits of various insects deemed injurious to the cabbage plant, and sundry specimens (some of which were the friends of the truck growers and the enemies of the real causes of damage) having been sent to this office, I referred the whole question to Mr. Stauffer, who replies as follows:]

Secretary Pennsylvania Board of Agriculture:

DEAR SIR: Mr. Harris described the pot-herb Pontia as the "Pontia Oleracea" in the seventh volume of the New England Farmer, in 1829, nearly fifty years ago; and what he then said has been very little improved upon in point of fact. I might copy *verbatim* what is published at page 270 in Flint's edition of 1862. For what is said of the "Pontia Oleracea" applies to the multiform group of species known as the "Pieris," adopting Schrank's generic name instead of that of "Pontia," under which generic name, Vincent Köllar, described three species in his excellent Treatise on Insects injurious to Gardens, &c., translated by J. and M. Loudon, with notes by J. O. Westwood, F. L. S., London, 1840. Our *Pieris rapae* is considered identical with the European species said to have been intro-

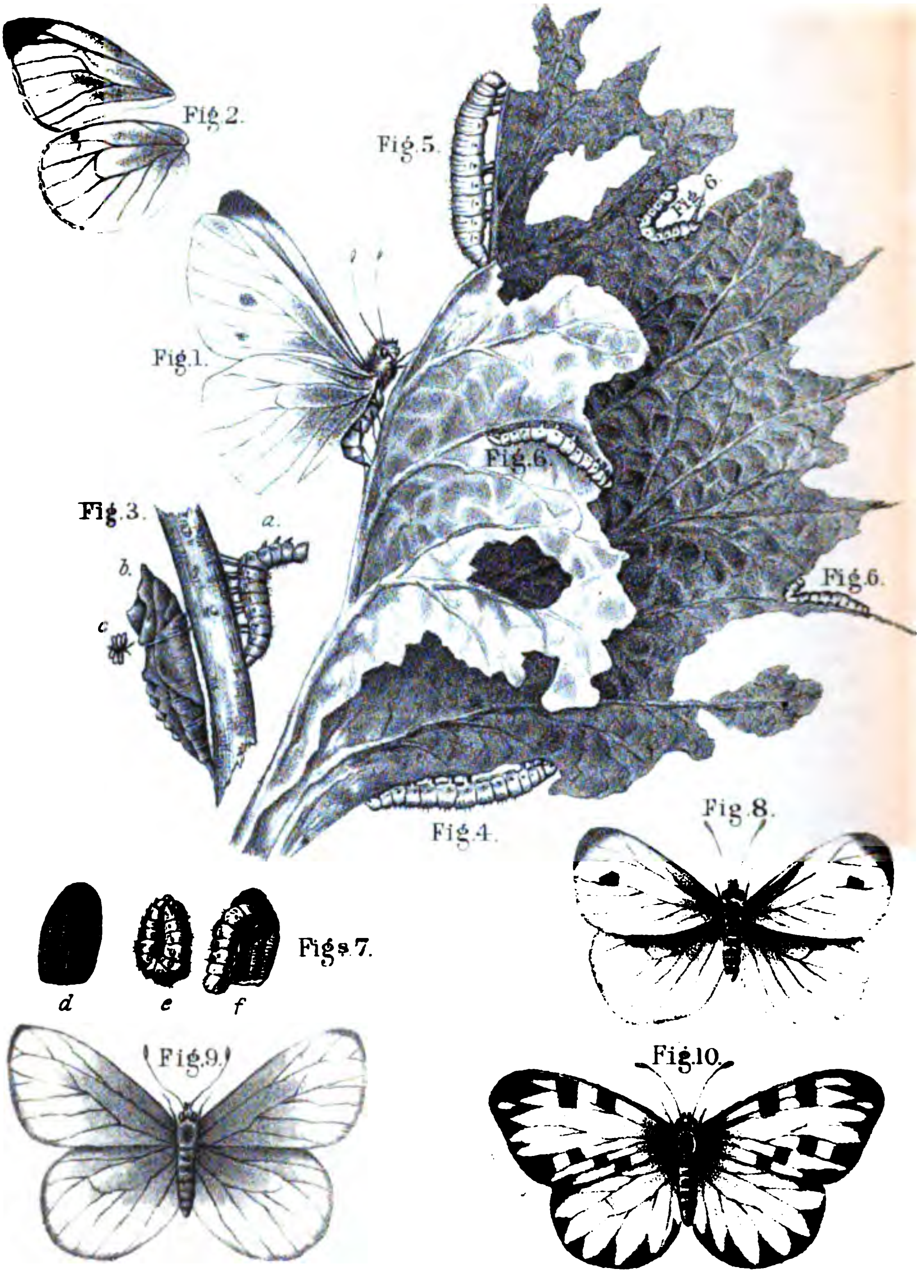


Fig.2.
Fig.5.
Fig.6.
Fig.1.
Fig.6.
Fig.3.
a.
b.
c
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Fig.4.
Fig.8.
Figs.7.
d
e
f
Fig.9.
Fig.10.

Fig.1.Pieris Rapae, famale, depositing eggs on a cabbage leaf,
Fig.2.Natural Size of wings showing the upper surface
Fig.3.*a*.A catterpillar having formed the band and hung itself in the loop.
b.A chrysalis, *c*.A parasitic fly. Figs 4.5 & 6. Larva. Fig.7. Eggs & hatching magnified.
Fig.8. Male P. Rapae. Fig.9.P. Oleracea Fig.10. P. Protodice

INSECTS INJURIOUS TO THE CABBAGE PLANT.

duced from England to Canada, in 1856 or 1857. It was first taken in Quebec, in 1859; in 1864, it had spread about forty miles from Quebec as a center; in 1866, it was taken in the northern parts of New Hampshire and Vermont; in 1868, it had advanced still further south, and taken around Boston and a few in New Jersey. Fig. 9 represents P. Oleracea of Harris. Fig. 8 the male, and 1 and 2 the female, P. Rapæ, and Fig. 10 the P. Protodice, or so called southern form, with their larvæ or catterpillars, Figs. 4, 5, and 6, on the cabbage leaf. My attention was first called more particularly to this subject from specimens sent by the editor of "Moore's Rural New Yorker," August, 1870, of the P. Rapae. I may be excused from giving a full description of the difference in the spots and colors of the various species mentioned, when I state, that according to the lenghtly report by H. S. Scudder, (*in Proc. Boston Soc. Nat. Hist.*, viii, 1861, 178,) setting forth the interchange of names of species described by Harris, Boisduval, and Kirby of the P. Oleracea, and P. Rapae of Europe, and the P. Protodice which he says is the American representative of the European *daplidice*, the Alpine *Callidice*, the Siberian *lencodice*, the South American *autodice*, the Arabian *glanconome*, and the South African *hellica.*

The illustrations will answer as well as lengthly descriptions. Scudder also says: "No possible step in the gradation from one extreme to the other is wanting, and both extremes are found equally among numerous examples from as widely distant places as Massachusetts and the Great Slave Lake, though the suite of specimens compared, indicate that the paler forms are more commonly met with in the southern localities, and the more heavily marked ones are the characteristic forms of the north," this is at variance with P. Oleracea and P. protodice. The character and habits of all are substantially the same. The variation in color or spots of the perfect insect or catterpillar. Notwithstanding, we may consider them as a group of pests to the cabbage garden, but we may state here that there are other insects that infest the cabbage, and in order to write intelligently I design to confine each group to its own order or sub-division.

The Pieris belong to the diurnal or day-flying butterflies. Order—LEPIDOPTERA, (scale winged, hence the German name *Staubflügler*, also called *Schmetterling.*) The states through which insects pass may be adverted to the *egg*, the *larva*, the *pupa*, and the *imago* or perfect insect. There are common names that should be properly used; the larvæ, whether smooth or hairy of butterflies and moths, we call *caterpillars;* those of beetles, *grubs;* of flies, *maggots.* The word *worms* applies to the earthworm and should be confined to true *vermes.* As the pupæ of butterflies are often tinged of a golden color or jeweled, the Greeks called them *chrysalides*, and the Romans *aureliæ.* We term them *chryalids.*

The female Pieris deposits her eggs in twos or threes, sometimes in greater number, scattered along the ribs of the cabbage leaves on the underside. They may be seen hovering over the cabbage bed or other cruciferous plants in the latter part of May and the beginning of June, this is a good time to catch them with a bag-net of muslin or thin netting over a hoop, on a pole; they fly low and rather sluggish. To capture and destroy them before their eggs are deposited, is to nip the evil in the bud, and as the old adage has it, "an ounce of prevention is better than a pound of cure." These eggs are about the one fifteenth of an inch in length—pear shaped—of yellowish color, and have a series of longitudinal ribs. Figs. 7, *d*, *e*, and *f*, show the egg enlarged, the position of the young larva, and the manner of its escape from the egg. They are hatched in a week or ten days, the young larvæ immediately take their station along the veins of the leaf and seldom on the outer edge, and being of a pale green color, are hard to detect without special examination. They feed and undergo several moultings, change color somewhat, the dorsal and latteral stripes become more conspicuous; the thin scattered hairs and size distinguish these larvæ from those of another class of lepidoptera, hereafter mentioned. Those of the *Pieris* attain their full size in about three weeks, and attain an average length of one and a half inch. It is a remarkable observation made by Reaumur and others, that the form of the chrysalis and butterfly becomes developed in the catterpillar seven or eight days before it changes into the pupa. So that a caterpillar may be regarded as a locomotive egg, having its embryo, the included butterfly, gradually developing by assimulating to itself the animal substance, resulting in a transformation as marvelous as the fictions of Ovid's Metamorphoses.

The larva of the cabbage butter-fly, when about to assume the pupa state, seeks some nook, pailing, or place to retire to and affix its thread or girth. If a brick or stone is used to secure a base, it previously covers a space with a web of silk, to which to attach the ends of the loop or girth, after attaching itself by the hooks or webbing in of the anal pro-legs, or caudal extremity. It contracts the body, holds to the rough paling with its hooked pro-legs, and spins a thread, attaches the end to the paling and forming a curve, carries it to a point where it fastens it again, thus swaying to and fro it forms a loop like the letter U of, perhaps, a dozen threads. Then by doubling itself up and thrusting the anterior portion of the body through the loop so formed, thus the bridle is made. The old skin then slouches off, and its old clothes are found in a bundle at the base. Next day, the fresh porous body exudes a white cream-like substance, which hardens and forms the parchment like chrysalis. Having been an eye witness to the above named procedure, I cut out the chip of the paling, when the insect had hung itself, and suspended it in a jar, placed it upon my office table for daily inspection, in about ten days the shell or chrysalis bursts, and the perfect butterfly will be born from the suspended caterpillar. Here we might moralize upon this and similar insect transformations. Kirby copies a lengthy poem found in a newspaper, the author unknown, the concluding verse reads:

"Go, mortal! in thy reptile state,
Enough to know to thee is given;
Go, and the joyful truth relate;
Frail child of earth! high heir of heaven!"

We will not stop to inquire why these wonderful changes should occur. I may be excused for relating my personal observation, when I state that Westwood follows other authors in describing the mode by which the bridle or girth is made. In the "Modern Classification of Insects, by J. O. Westwood, F. L. S., London, 1839; Volume II, page 336, it reads thus: "In the girt chrysalides, the caterpillars not only attach themselves by the tails, but also, by throwing the head from side to side, spin a number of threads across the middle of the body. The skin of the caterpiller then bursts, and is slouched off, the contraction of the body forcing it beneath the girth." I quote from good authority, and offer no comment. Harris also says: "Bending its head on one side, the caterpillar fastens to the surface, beneath the middle of the body, a silken thread, which it carries across its back and secures on the other side, and repeats this operation till the united threads have formed a band or loop of sufficient strength." This may mean the same thing—only, to carry each thread across the back, certainly differs from the case I witnessed. And, therefore, put it on record, perhaps the caterpillars have discovered a more handy method of doing the thing. The evil done by these caterpillars, however great, it must not be overlooked that nature has provided a check to them by the numerous minute parasitic species of hymenoptera, or four winged flies, like the ichneumons and chalcidians, Figs. 23 and 24. Some of these lay their eggs into the larvæ and chrysalis, and when a dead or sickly caterpillar is found, having little pellets of a silky or cottony nature attached to them, let them alone, they will breed the parasite. So also with the brown colored chrysalids—these are a nidus for a brood of from forty to sixty parasites, and should not be smashed; the altered color of the chrysalis tells the tale. These minute flies have long and hard names, a mere mention of which would add little to the main fact—that they are useful to check the excess of the cabbage butterfly, aphids, &c., and their development should be promoted. And the various caterpillars found infesting the plant of whatever size or form, destroyed. Harris also mentions another small, cylindrical, pale green caterpillar that riddles the cabbage leaves—these wriggle and jerk like maggots, when disturbed, and drop by spinning a thread to let themselves down. The little moth is known as the cabbage moth, "Cerostoma Brassicella." There are, no doubt, two broods, having been detected as late as the middle of October. These spin gauze-like cocoons around the pupa or chrysalis, like net-work, which are but slightly attached to the leaf. These belong to the family *Tineidæ*, insects very variable, and forming an extensive series of minute lepidopterous insects. (Fig. 11, *a*, caterpillar; *b*, chrysalis; *c*, the thin cocoon that covers it; *d*, the perfect insect.)

Then, again, an insiduous foe is found to lurk in the soil, and works during the night, cutting off or destroying the young cabbage plants set out the day before, and doing great damage, If search is made, the author of this mischief may be found curled up, as seen in Fig. 12, within a few inches of the injured plant, under the soil. A smooth, greasy looking-customer, one of our common cut-worms—but a true caterpillar of a moth—such as the mamestra brassicæ, and allied genera, and belong to the class usually on the wing in the dusk of the evening, and termed nocturnal. There are a number of species among those moths, known by their crests, like the Plusia, Agrotis, and their allies. Harris proposes the name of *Agrotis devastator*, for this naked caterpillar that feeds on cabbage and other succulent garden vegetables, (Fig. 14.) There is one other caterpillar described long ago by Doctor Melsheimer, as the "Zebra-catterpillar" which attains a lenght of nearly two inches by September, goes in the ground in October, and changes into a shining brown chrysalis, (Fig. 13,) and comes forth about the 1st of June—as it is also known to go into the ground in June, in Pennsylvania, and comes out about the 1st of July. There are evidently two broods. This is the painted Mamesta, *Mamesta picta*, and is of a light brown color, shaded with purple brown, having spots on the fore wings, with a third oval spot behind the round one, edged with gray, zigzag lines, the middle somewhat in the form of the letter W. This belongs to a different group of nocturnal insects from that known as the *Owlet-moths*.

There seems to be a foe to the cabbage in another so called cut-worm of a smooth, hard, and rather thin and shining body, properly a wire-worm. Mr. J. B. Martin, Kingston, East Tennessee, May 27, 1870, sent the larvæ, so destructive in his garden, to the editors of *Moore's Rural New Yorker*. This was forwarded to me, and of which illustrations and an opinion given as published in No. 1, Vol. XXII, page 15, for July 2, 1870, (Fig. 14) *a* and *b* magnified portions 15 insect. This larva is that of a skip-jack or spring beetle, a close relation to the genus *Agricotes* among the *Elateridæ*.

There larvæ have been detected in the roots. They greatly resemble the well known meal-worm order, coleoptera.

It is worthy of notice that among the various families of insects, and even among those of a single genus, there are individuals whose habits are evil and injurious to vegetation or other animals. But, as with the parasites, while they are destructive to other mischievous insects, are of service. Thus it is, opposing forces from either side, seem requisite to propel an onward progress in the economy of nature.

For instance, among the Hemiptera or true bugs. One in connection with the cabbage plant deserves special notice.

My attention was called to this class by specimens I received from the editor of *Moore's Rural New Yorker*—for a name, which were sent to him by George D. Davis & Son, from Lynchburg, Virginia, under date of June 27, 1870. My report is published in that paper, in No. 5, volume XXII, July 30, 1870, page 79, with my illustrations.

Mr. Davis says, "these bugs are making fearful ravages in our gardens. Their depredations are confined more particularly to cabbage and kindred plants," (cruciferæ,) and asks: "What are they? And is there any means to exterminate them?" Although the insects sent me were alive and beautifully colored, they were yet only pupæ not fully matured. So that I could not reconcile it with the figures in the *American Entomologist*, page 79, for December and January, 1870. I copy their figures of the Harlequin cabbage bug, Fig. 16. wings closed and expanded, and that of the pupæ sent me, Fig. 17, I will copy my discription. "Head triangular, the eyes very prominent. There are two milk-white spots, centrally on the face, the antennæ four jointed, the second joint longest; the first and fourth shortest. The shape of the body and thorax is of a round oval form. The thorax has the sides of a deep yellow color, widening out posteriorly into a rounded base inwards. There is a small spot on the inner side of the margin above and below, and a large oborate spot on the center, also yellow. The meta thorax has three milk-white spots, the central obovate, elongated. There is also a yellow spot on each side on the lobe of the undeveloped wing; there are two lozenge-shaped yellow marks on the scutellun joined by a prolonged point on each. The abdomen has a submarginal horse-shoe shaped yellow band, traversed by irregularly curved white lines, and five of such lines appear out side the yellow marginal band, otherwise the insect is of a black color. This gray attire of spots would suggest the name of "Harlequin," applied to the *Strachia histrionica* of Hahn. It is interesting to notice, that Doctor Gideon Linceum, of Washington county, Texas, in the year 1866, gives a graphic description of the ravages of a similar insect. Doctor Summer, of Salisbury, in North Carolina, again described it as the "Texan cabbage bug," found very injurious in 1867. Now, if that of Davis is the same, as I suspect, we find this Texian depredator like the Colorado "Potato beetle," (bug, usually called) coming further north and east. So with the cabbage-butterfly traveling south, year by year.

This "Harlequin cabbage bug," has not yet been detected in Pennsylvania, to my knowledge but it is well to know that it may reach us in another year, also, and run its course with the rest of the invaders. Here I might mention the canibal-bug—*Reduvius personatus* sir. Blood sucking cone-nose or big bed bug. *Conorhinus sanguisuga*, Lo conte, spined soldier bug, (Fig. 18.)—*Arma spinosa*, &c., as antagonistic, to other vegetable feeders, and like the insectiverous bird, and predaceous coleoptera and their larvæ, parasitic flies, etc., are friends to the gardener, and so far

Fig. 11

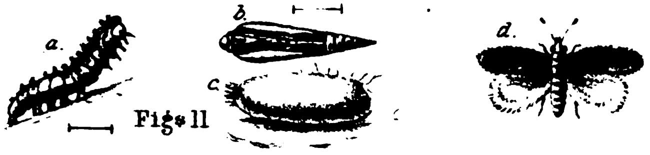

Fig. 12

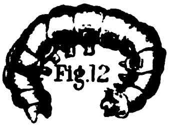

Fig 13

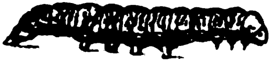

Fig. 14.

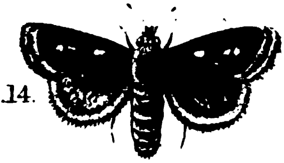

Fig. 11 *a*. Larva. *b*. chrysalis. *c*. cocoon. *d*. perfect insect of Cerostoma Brassicella.
Fig. 12. Cut-worm. Fig 13 Zebra cut-worm. Fig. 14. Agrotis devastator.

Fig. 14

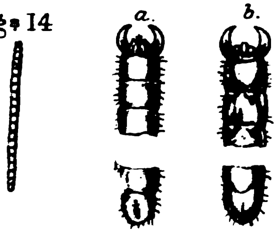

Fig 15

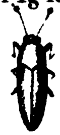

Fig. 14. Wire-worm. *a* Magnified upper. *b* Lower terminal portions. Fig 15 Skip Jack Agriotis.

Fig. 17

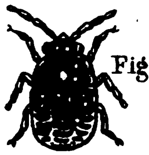

Fig. 16

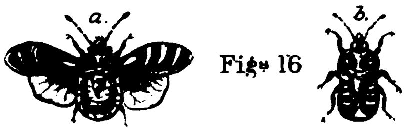

Fig. 18

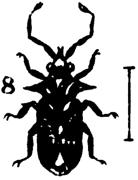

Fig. 17. Pupa of a cabbage bug.
Fig. 16. Harlequin bug *a*. wings spread. *b*. repose.
Fig. 18. Spined soldier bug Arma spinosa.

Fig. 19.

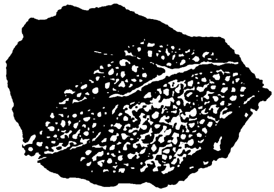

Fig. 22.

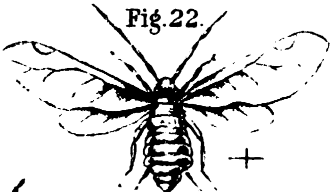

Fig. 23.

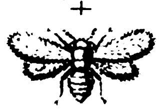

Fig. 20.

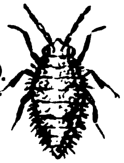

Fig. 21.

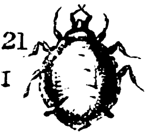

Fig. 24.

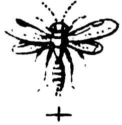

Fig. 19. Mildew Aphids on a cabbage leaf.
Fig. 20. Magnified. Fig 21 being inflated by parasitic larva.
Fig. 22. Aphis Mali winged.
Fig. 23 & 24. Character of the minute parasitic flies, magnified. Numerous species are known.

INSECTS INJURIOUS TO THE CABBAGE PLANT.

a knowledge of entomology is of great use to enable us to distinguish between the good and the evil.

I cannot leave the subject without noticing the nauseous effect on cabbage, by a series of aphids, that produce a mildewed-like appearance, found in dense masses on the cabbage, sapping its juices and impoverishing the plant. Fig. 19 shows a leaf infested; 20, a magnified insect; 21, one inflated with parasites, the eggs of minute flies, like Figs. 23, 24.

There is a species of plant lice very similar to those found in chinks and rough places in the bark of apple trees, known as "apple tree blight." Illiger called this genus *Lachnus*, but Leach's name is adopted by Fitch, that of *Eriosoma*. These minute creatures, in the order *Homoptera* and class *Aphidæ*, or plant lice, are distinguished by transpiring a cottony excretion; otherwise, they have the honey tubes, and when matured have the general appearance of other *Aphids*. These are separated into different genera by having slight differences in the variation of the wings, joints of the antenna, length of sucking apparatus, or the like. All, or any of them, are great pests on vegetation, and a source of vexation to the florist or gardener. The name *Aphis* is from a Greek word, which signifies to "exhaust." (Fig. 22, *Aphis Mali*, gives a correct idea of this family, only it is magnified.) They are found upon all parts of plants, the roots, stems, young shoots, buds, and leaves, and there is scarcely a plant which does not harbor one or two kinds peculiar to itself. Réaumur has proved that one individual, in five generations, may become the progenitor of nearly six thousand millions of descendants. They are usually wingless, and the first broods are females; the males are smaller, and appear in autumn, when both kinds assume the winged state, and then often emigrate in dense clouds, and are known as "smother flies." The cabbage louse, *Aphis Brassicæ*, has, also, long honey-tubes, but its body is covered with a whitish mealy substance. This species is often very abundant on the under side of cabbage leaves, in the month of August, sucking the sap and causing the leaves to wilt and shrivel up. It is not my object to enter upon a more extended view of this family. Where the ends of young branches are crowded with them, by moving them briskly through a solution of whale oil, or other strong soap, they can be removed; fumigation of sulphur, tobacco, and other methods, have been recommended, but it requires patience and vigilance to exterminate them. Copious rains often destroy them, and syringing is, perhaps, the most expeditious and better method to cleanse plants without injury. Notwithstanding the numerous remedies published from time to time, these often depend more upon the surroundings and climatic or electric conditions that intervene, than the supposed remedy made use of, which, when tried by others, may totally fail. Vigilance and persevering attention seems the most reliable, with the aids that nature supplies.

To complete the history of our cabbage butterfly. It may not be generally known that they are often found to emigrate in immense swarms, equal to the flight of locusts. H. Kapp, (in the *Naturforcher*,) informs us he "observed, on a calm, sunny day, a prodigious flight of the noxious cabbage butterfly, which passed from north-east to south-west, and lasted two hours." Kalm saw these insects midway in the British channel. A similar butterfly, if not identical, was seen by Mr. Darwin and Captain Fitzroy, when at sea, about ten miles from the bay of St. Blas, on the coast of South America, computed to occupy a mile in width, several miles in length, and two hundred yards in height, passing over the ship—that the sailors exclaimed: "It is snowing butterflies!" Lindley also mentions the fact in the *Royal Military Chronicle*, so that the fact cannot be questioned. Thus a whole section of country may be suddenly invaded, and no foresight could prevent it. This may be no consoling news; but, if new to the reader, facts should be known.

"ROPY" OR VISCID MILK.

PRELIMINARY REPORT OF DR. HENRY LEFFMANN, *Microscopist of the Board.*

[NOTE BY THE SECRETARY.—In compliance with the request of official reporters and correspondents in Chester and Delaware counties, I, under authority granted by the Legislature, directed the attention of the scientific officers of the Board to the loss entailed upon the dairymen of these counties from "ropy" or viscid milk. The disease being deemed one of those causes of disorganization which can be best observed under the microscope, the task of the special examination was assigned to Dr. Leffmann. As stated in his report, the number of cases was rapidly diminishing, (when he took it in charge,) but in a belief that any work accomplished during the fall would be available next year, he was instructed to make such progress as was warranted by available cases, leaving the extended examination for another season.]

To the Secretary of the Pennsylvania Board of Agriculture:

DEAR SIR: I propose to bring together in this report the results of some examinations made during the last summer. I regret, however, that my results have not been statisfactory, but it has seemed to me that by reporting the observations thus far made, it might induce others to give facts which either support or oppose the views which are here presented, and as this investigation is to be continued in the succeeding season, it will proceed upon a broader basis. "Ropy milk," it should be remarked, is really a misnomer, since it is the cream and not the milk which shows the condition. But I continue to use the old name, because the mere title is of no importance, and the more exact expression would sound strange. The condition called "Ropy milk" is such that when the liquid is poured out of a vessel or a portion lifted with a spoon, it strings out as if mixed with starch or gum, or like mucus. Some samples have been described to me as stringing out nearly a foot long, but I have never seen any approach to this. In fact, I have thus far seen only very slightly ropy milk. It is barely possible that there is more than one kind of ropiness, which would account for contradictory statements in regard to the subject. But at present this could not be taken as a point in the case. When we inquire into the conditions under which ropy milk is produced, we find temperature very important. I do not believe it has been definitely observed in winter. I have been told of a case in which the difficulty appeared in winter, and was ascribed to cows being fed on turnips, but the circumstances are not well made out, and I am not certain that case was the true form. It is certain, however, that temperature is not the only cause. There must exist also certain conditions of moisture, and the trouble is much more apt to arise during close damp weather than during the hotter but drier days. As to how far the trouble may be connected with disease in the cow, it may be said that its sudden appearance and disappearance would not be in favor of this view. I have, of course, found those who are quite content to assign such disease as the sole cause. The belief in the remarkable results caused by "hollow horn" is yet sufficiently prevalent, and I have been gravely assured that by boring the horns and splitting the tail a cure would be effected. But the prevailing opinion as to the cause of ropy milk is that which ascribes it to the presence of low forms of vegetable life, derived more especially from the water which the cows drink. It is said by some that these have actually been seen in the milk.

At the present time the germ theory of disease is very popular, and the extensive distribution of microscopic life often gives apparent confirmation to its views. There is, however, no doubt but that, in many cases, the germs merely accompany the conditions under which they are found, and are not the cause or consequence of the changes going on. This is the view, for instance, which we must take in regard to the fungi found in the false membrane of diphtheria. These fungi cannot, for a moment, be supposed to be the cause of this deposit. There are, however, some points in the history of the development of ropy milk, which closely accord with the history of the development of a fungus, among which may be mentioned the favorable effect of temperature and moisture, and the fact that the ropiness requires some hours to develop. Yet, I cannot forget that in the cases which have come under my notice, the ropiness has appeared and disappeared under atmospheric changes too slight to affect the growth of living vegetable tissue. It does not seem likely that such organism should be favorably or unfavorably affected by any of the changes of temperature or moisture, which occur from day to day, during our summer season. Changes of temperature from ninety degrees to thirty-two degrees would, of course, be very effective, but not changes from ninety degrees to sixty degrees, or the reverse.

During the past summer, I have examined two farms upon which ropiness of milk had occurred, and I shall give a description of these two places. The first was the farm of Mr. Horace J. Smith, at George's Hill, Philadelphia, just outside the limits of Fairmount Park. This farm includes about one hundred acres of rolling land, most located at a high level, well drained, and consisting, as usual, of timber and cleared land. Twenty-seven cows were in service. The ropiness gave much trouble during the month of August. The examination of samples of milk, taken at different times, showed nothing that could throw light on the cause of the difficulty. And here I may remark that, in none of the samples of milk that I have examined this season, in this investigation, did I find anything abnormal. By way of further elucidating the matter, samples of water were taken from the farm, one from the barn-yard trough, which was supplied from the spring-house, and the other from a ravine in the woods adjoining the pasture land. The two samples of water were among the clearest and purest I have ever seen. In the examination of several hundred waters, taken from various parts of Pennsylvania, I have rarely encountered better water than these samples, both as to clearness and freedom from dissolved matter. In this case it has seemed to me a violent assumption to attribute the trouble to such water as this. The cattle on this farm are well cared for, are carefully driven to and from their stables, and experiment has shown that the ropiness has occurred with and without the use of brewers' grain. In short, I could find no circumstances to which I could point as the cause of the difficulty.

The second instance, was the farm of the Westtown Boarding School, in Chester county. This farm consists of about six hundred acres of land, not differing materially from the farms in this section of country. About sixty cows are milked here. When I visited the farm, the weather had been cool for about twenty-four hours, and a heavy rain had just fallen. All definite ropeness had disappeared. The condition under which the cows are kept on this farm is most favorable. The stables are roomy, well ventilated and clean. The spring houses also are commodious, clean, and cool. The cows have access to both meadow and upland pasture, and it was stated that the cows which were put on the meadow, were much more likely to give ropy milk, than those on the upland. But no special effort had been made to test accurately this point, and it remained rather an opinion of some of those engaged about the farm. At the time of my visit, several samples had been set aside from special cows. Some pastured for day a or two in meadow, and some on upland, but I could not distinguish any difference between the samples, either by the eye or by the microscope. As regards the effect of lowland pasture, it must be borne in mind, that vegetation is ranker and often more poisonous when growing in wet than in dry ground. The meadow ground of this farm is watered by a stream which receives, some distance above, the whole of the drainage of the college building, and a chemical examination of the water shows sewage contamination. This was the only defect that I could discover in the arrangement of the farm.

In addition to the facts thus collected, I am indebted to Mr. Horace J. Smith for the information that ropy milk has been noticed in many localities outside of our own limits. Correspondence in an English journal devoted to agriculture, has shown that the difficulty occurs in England, and on the continent of Europe, even so far east as the Austrian dominions. During the past season it has been quite common in Chester and Delaware counties, occurring on some farms which, as far as known, have not suffered before. Unfortunately, most of the instances were unknown to me until the trouble had disappeared. Late in August, the Delaware County Institute of Science appointed a committee to investigate this subject, but the condition had so completely disappeared that the committee were quite unable to obtain specimens. In conclusion, I may say that while my own observations have not inclined me to adopt the theory which ascribes ropy milk to the development of germs, yet it must be admitted that conditions which are unfavorable to the development of germs of fungi, are also unfavorable to the bringing about of this change in milk, and hence are indicated as preventive measures. On farms, therefore, on which this trouble occurs, it should be met by extra attention to cleanliness and keeping the milk as cool as possible, and preferring, if the farm allows it, upland to meadow pasture. In one case, on a farm near the city, the difficulty was pretty satisfactorily met by serving together the milk of the afternoon, (half past five o'clock,) and of the early morning (three, A. M.) of the day succeeding. By this method, the milk was, at most, only about twelve hours old, and this seemed to do tolerably well, although somewhat troublesome to the farm hands. I have received from several sources very positive assurance of the usefulness of saltpeter, in small quantities, administered to the cows, and even by means of small pieces put into the milk. So simple and safe a remedy should, by all means, be given a fair trial. I am unable to give any explanation of its mode of action. On the animal system, its effect is chiefly that of a stimulant to the kidneys; its cooling action is imaginary.

A DEPARTMENT OR STATE BOARD OF AGRICULTURE.

By C. L. **FLINT**, *Secretary Massachusetts State Board of Agriculture.*

What is the difference between a State Board of Agriculture and a State Agricultural Society? Some thoughtlessly confound them or use them as convertible terms, while, in fact, they are radically different. Their organization, functions, objects, and methods, differ widely, and this difference ought to be understood and considered before arriving at any conclusions as to their comparative merits as a means for advancing the great interests of agriculture. They are by no means antagonistic. They ought to work in harmony, for neither can so well do the work of the other.

A State board is simply a part of the civil government. It may be a department, co-equal with other departments in dignity and responsibility, like a ministry of agriculture in some countries on the continent of Europe, or it may be subordinate, in the form of a bureau, either attached to some other department, or comparatively free and independent in its functions and methods. It is not organized for the same purposes, nor is it designed to perform the work of a society. Its object is rather to bring the work of all the societies into harmony and system, to generalize their results, and to make them effective for good beyond the limits of the locality where they are attained.

It is not the province of a department or State Board of Agriculture to hold fairs or popular exhibitions. A State society can do that work much better, as it is supposed to have funds and other facilities which a State board has not. Its work is rather executive or semi-legislative in character, and it should exercise a general and advisory control over the methods of conducting exhibitions, and the disposition of the money which the society may receive from the State. It was not designed to supersede the necessity of societies in any respect, but to stand at their head as a central bond of Union between them.

There was once a United States Agricultural Society, whose field of operation was as wide as the country. It did great good, by bringing vast numbers of men together from distant sections, and exhibiting the products of very distinct systems of agriculture. But, comparing the objects and methods of that society with the organization and purposes of the Department of Agriculture, at Washington, can any one imagine that if that great society had maintained its existence and its beneficent activity, it would have been capable of realizing the grand possibilities of the Department of Agriculture?

A distinguished English writer, stating the advantages which had resulted from the establishment of the British Board of Agriculture, remarks that, "before the board was instituted, the bond of connection among farmers was slender, and served few useful purposes. Each trusted to his own information, and knew little more about the practices of conterminous districts than that of China, or the most distant country. The establishment of the board removed, at once, all these evils and difficulties. It made farmers, who resided in the most distant quarters of the kingdom acquainted with one another, and caused a rapid dissemination of knowledge among the whole profession. The art of agriculture was brought into fashion, old practices were amended and new ones introduced, and a degree of exertion manifested, which had never before been exemplified in this island."

The same results have followed from associated effort in this country. If we could fully appreciate the difference between the agriculture of the present time and that of a hundred, or even fifty years ago, we should be amazed at the progress that has been made; and if we should seek for the cause of this progress, no fair minded man can avoid the conclusion that a very large part of it is due to associated effort. In fact, all history teaches us that to accomplish great objects, whether of improvement or the attainment of material results of any kind, it is of the highest importance to collect men together, and to bind them by association for the purpose. We are so constituted that mental activity receives a powerful stimulus from combination. Association of effort may be said to be the distinguishing feature of our modern civilization.

A period of extreme depression followed the struggle of the Revolution, and farm production, like most other industries, was brought to a partial stand-still. It took time to recover from the effects of the conflict. But the importance of some effort to develop and improve the agriculture of the country, soon began to impress itself upon the minds of the more intelligent and public spirited portion of the community, and the result of their deliberations was the formation of societies for the encouragement of agricultural improvement. The South Carolina Agricultural Society was organized in 1784; the Philadelphia Society for promoting Agriculture in 1785; the New York (city) Society in 1791, and the Massachusetts Society for Promoting Agriculture in 1792.

These were organizations composed of men, for the most part, who were in advance of their time. They did not reach the mass of the people. The average farmer of that day did not appreciate their efforts. He was not to be taught by men who never held the plough. He was wedded to old customs, and followed the traditions of his fathers. The influence of the societies was, therefore, extremely circumscribed, but they constituted the "leaven" which was gradually to work its way through the body politic. It was twenty or thirty years after these societies were formed before any public exhibitions were held, and before any subordinate or county societies were formed. The public exhibition which has become so marked a characteristic of our time, appears to have originated with the Columbian Agricultural Society for the Promotion of Rural and Domestic Economy, whose first display was made at Georgetown, D. C., on the 10th of May, 1810, when liberal premiums were offered for the encouragement of sheep raising, &c. From that small beginning, local societies multiplied, and local or county exhibitions were soon held in various parts of the country. Their usefulness in diffusing information and stimulating mechanical ingenuity and invention was so manifest that the State governments took measures to encourage the formation of county agricultural societes, by offering bounties to be awarded through them. Such bounties were paid in Massachusetts as early as 1819, and by some of the other States soon after that date. Indeed some of the States, influenced, perhaps, in some measure by the advice of Washington, embodied a clause in their Constitutions or organic laws, making it "the duty of Legislatures or magistrates to encourage private societies and public institutions by rewards and immunities, for the promotion of agriculture, arts, sciences, commerce, trades, and manufactures, and a natural history of the country."*

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*Constitution of Massachusetts, Chap. V, Sec. 2.

Under the stimulus of official encouragement, and the influence of enterprising and public-spirited individuals, very many of the flourishing counties in the older States had organized agricultural societies previous to the middle of the present century. In Massachusetts, for example, with fourteen counties, there were fifteen agricultural societies in 1850, most of them in a flourishing condition, and all receiving a bounty from the State at the rate of $200 on each $1,000 of capital actually paid in and safely invested as a permanent fund, up to the limit of $3,000; that is, any society having $3,000 so invested, over and above all debts, was receiving $600 a year in bounties, to be awarded in premiums at its annual exhibitions.

The societies were required to make certain returns once a year, to the Secretary of the Commonwealth, whose duty it was, after 1845, to publish an abstract of such returns for distribution among the people. This abstract was intended to contain the more important and instructive portion of the transactions of the societies. It appeared in the form of a pamphlet, little condensed, and possessing few attractions for those whom it was intended to benefit, and the result was, it was but little read, and but little called for by the farmers of the State.

The county agricultural societies were comparatively isolated. There was no united or concerted action on their part, no bond of union, no central head to bring about any harmony of action, or to simplify and vitalize their returns, so as to secure the good which they were intended to accomplish, the interest and instruction of the people. A movement was made, therefore, by the societies themselves, to remedy this defect, and a convention, consisting of representatives of the incorporated societies, after a thorough consideration of the subject, resolved to petition the Legislature, which it did, stating "That, inasmuch as agriculture is the chief occupation of her citizens, the Commonwealth, in the organization of her government, should be provided with a department of agriculture, with offices commensurate with the importance of the duties to be discharged and the labors to be performed."

The Legislature cordially acceded to this request, and the State Board of Agriculture was organized as a department of the government, by an act approved on the 21st of April, 1852.

As the Massachusetts State Board was one of the first established in this country, and one from which the State boards of many of the other States have been modeled, it may not be out of place to allude to its organization, its functions, and what it has accomplished in the first quarter of a century during which it has been in existence. Its primary object was to supervise the distribution of the bounties paid by the State for the encouragement of agriculture; to systematize the returns of the various societies, to diffuse the information gained through them and from other sources, and to do it in a way to attract attention, and to awaken an interest and a spirit of inquiry among the farming community. It is generally admitted that it has accomplished these objects. It is not organized as a society; has no permanent president, no treasurer, and no funds at its control, as a well organized society has. All its expenditures are provided by special appropriations of the Legislature, and are fixed by law. In order to connect it intimately with the Government, and to give it a more direct influence over the legislation in regard to agriculture, the Governor, the Lieutenant Governor, and the Seretary of the Commonwealth were made members *ex officio*, and when the agricultural college was established, the president of that institution was added to this list, and subsequently the State agricultural chemist, an office created by the Board itself, and filled by appointment of the board. The Governor and council appoint three delegates at large, who hold their offices for three years, and each society that receives the bounty from the State has the right to elect one delegate, who holds his office for three years. This organization, it will be seen, connects all the societies with the State government, and gives them an influence which they could not otherwise have.

It is apparent that the board is a representative body composed of delegates from each society, and the societies are so organized as to include every farm and accommodate every farmer in the State. It is authorized by the act which constituted it "to investigate such subjects relating to agriculture in this State as they think proper," and is empowered to "hold in trust and exercise control over donations or bequests made to them for promoting agricultural education." It is required to make annually a detailed report of its doings to the Legislature, and the secretary, as the only executive officer, is authorized to "appoint one or more suitable agents to visit the towns in the State, under the direction of the Board, for the purpose of inquiring into the methods and wants of practical husbandry; ascertaining the adaptation of agricultural products to soil, climate, and markets; encouraging the establishment of farmers' clubs, agricultural libraries and reading-rooms; and of disseminating useful information in agriculture by means of lectures and otherwise."

All the societies, including the Massachusetts Society for Promoting Agriculture—a State society—are required to make uniform returns to the secretary of the State Board of Agriculture, as a condition of receiving their portion of the bounty, and it is the duty of the secretary of the board to digest these returns and present them to the Legislature in an annual report, embodying their most valuable portions, for distribution among the people. The abstract before alluded to as having been prepared under the direction of the Secretary of the Commonwealth, previous to the organization of the State Bóard, had been little sought for and little read, scarcely two thousand copies a year having been disposed of. But the report of the Board was so generally demanded, that the number printed soon rose from three thousand to five thousand, then to eight, ten, and twelve thousand copies, and even that did not supply the demand by several thousand copies. The popular taste for reading and for scientific investigation in agricultural subjects gradually increased, and the spirit of inquiry became more general.

The Board took measures, quite early in its history, to secure by legislation a greater protection to the interests of sheep husbandry, and though the laws fixing a tax upon dogs to secure a fund to reimburse the losses by the owners of sheep have not had the effect to multiply the numbers of these useful animals in this State, they have remained upon the statute book, and are generally regarded as just and reasonable, and are as rigidly enforced, because sustained by public sentiment, as any other laws relating to the taxes. The original law, with its subsequent amendments, all of which originated in the Board, after affording some protection to the owners of sheep that may have been destroyed by dogs, has the effect to restore back to the towns a surplus fund of more than a hundred thousand dollars a year for the support of town libraries, public schools, and the advancement of learning.

The Board soon instituted an elaborate series of experiments designed to throw light upon a multitude of questions relating to the details of feeding stock, the drainage of lands, the value of special fertilizers upon the growth of crops, and many other points on which farmers were seeking for information. These experiments were among the most valuable of that day, and did much to stimulate the spirit of inquiry, and to lay the basis for the more recent steps of progress.

The dreadful disease among cattle, commonly known as the pleuro-pneumonia, was imported into the State in some Dutch cattle in 1859. As soon as the attention of the State Board was called to the fact, active measures were taken to interest the Legislature so far as to secure an appropriation for its extirpation. Strange as it may seem at the present day, so great was the ignorance that prevailed at that time in regard to the nature and the terrible danger of the disease, the application met with a determined and persistent opposition, so that when the small appropriation, which if it had been promptly made would have been quite sufficient to meet the case, was finally granted, it proved to be wholly inadequate. During the delay and the hesitation incident to protracted hearings, the insidious disease was rapidly spreading from herd to herd, and every day—every hour—increased the difficulty and the expense of checking it. The object was accomplished through incredible labor, and in the face of many obstacles, but it cost the State treasury something like seventy thousand dollars, while the losses to individuals were quite as much more. Five thousand dollars promptly granted when it was first asked for by the Board would have effected the object, and saved untold suffering and loss to individuals. Through the efforts of the State Board, an efficient cattle commission was created and clothed with power to control contagious diseases among cattle.

No fair-minded man of ordinary intelligence will pretend to deny that, if it had not been for the persistent and determined efforts of the State Board, we should have had the most dangerous and the most terrible of all the contagious diseases among stock permanently fixed upon our herds, as it is upon the herds of many parts of England. Had it not been arrested and completely stamped out, it would undoubtedly have spread to other parts of the country, and inflicted untold loss upon the owners of stock far and wide. The value of the service which the Board thus rendered to the State far surpassed all the cost incident to its organization from the date of its existence to the present time. In proof of this assertion, I need only refer to the experience of England, where the losses from this disease alone amount to some millions of pounds, annually.

Another and most important service the board has rendered to the farming community, was the initiation of a system to regulate the manufacture and sale of commercial fertilizers, under what is commonly known as the "Fertilizer law," with a rigid scientific inspection of all fertilizers imported and offered for sale within the State. This law, which at first met with determined opposition from the manufacturers interested, has come to be regarded as one of the most useful laws ever passed, and has commended itself not only to farmers, for whose protection it was originally designed, but to the manufacturers themselves, who have, as a general rule, cheerfully paid the tax imposed in the form of license, while the public confidence in the general honesty and high quality secured in the manufacture of such articles, has increased their use by farmers to an amazing extent. The regulation of this trade has indeed worked an almost entire revolution in the whole business of commercial fertilizers, and has had the effect to raise it to a far higher standard than it ever had before, while the scientific investigations and reports of the State Inspector of Fertilizers, appointed by the Board, have been among the most valuable contributions to scientific agriculture ever published in this country.

The importance of this great change can hardly be over estimated. Previous to it the whole fertilizer business was so conducted as to create a just and universal distrust of the quality of these articles. Farmers were swindled to such an extent that the use of artificial aids in the production of crops and the supply of plant food had fallen into extreme disrepute, and the sale and use of such fertilizers was very greatly limited in consequence of this state of things. Since the farmer could buy artificial fertilizers with some degree of confidence in their quality, it has come to be recognized that they may be made to increase the possibilities of production many fold. It may be mentioned, as an evidence that some such action was imperatively needed, that several of the States have enacted laws for the inspection of fertilizers, based on the Massachusetts law.

These examples of the results which have followed the organization of the State Board might be multiplied, so as to show the influence which has been exerted during the last quarter of a century in every department of farm economy. And if anything more were needed to show the advantages which have arisen from the recognition of a central power intimately connected with the government itself, and striving to advance this great material interest, it would be sufficient to make the contrast between the agriculture of the present day, with its intelligence, its enthusiasm, its spirit of inquiry, and its practical results, and that of a quarter of a century ago, with its general apathy, its adherance to tradition, its slow and imperfect methods, and its want of adequate mechanical appliances.

Now, it may be said that a State society, or an organization similar to that of a society, might have effected the same results, and proved as efficient and useful, during the last quarter of a century, as the State Board has been. But this is not so. A moment's reflection will satisfy any fair-minded and impartial man that it cannot be so. The Massachusetts State Society, with its ample funds, could not have exerted the influence over the agriculture of the State during the last twenty-five years, which the State Board has exerted, without any funds in its control. A society is differently organized. Its functions and purposes are different. It is not, in the same sense, a representative and a semi-legislative body. Without the intimate official connection with the Government, it cannot act with the same promptness and power, in the case of great emergencies, like the invasion of a contagious cattle disease, or any other evil of the same gravity. This weakness might not arise from any fault of the officers, or any inefficiency in the management. It is inherent in the organization itself.

The work of a State Board of Agriculture is more varied and far reaching than many people suppose. The Massachusetts Board, for example, immediately after its organization, instituted a correspondence and exchange of documents, not only with all the States having State Agricultural Societies, or similar State Boards, in this country, but with many other countries, some of them as distant as the Sandwich Islands and Australia. In this way it has been in the receipt of many documents and books, many of which are of great value. These it has freely placed in public and town libraries, where they are brought within the reach of the people. It has given more than two thousand bound volumes to town libraries, in the State, within three years, and this work has been quietly going on for twenty-five years, without any bluster or public notice, and scarcely even with any acknowledgment, but it has been a work of beneficence, nevertheless, and has, no doubt, had its influence on the public intelligence.

It is not to be overlooked, also, that an officer stationed at the capital, as the executive officer of the board would naturally be, is in a position to do a vast amount of good in the way of a medium of communication between buyers and sellers of fine stock, or persons desiring places as foremen and others wishing to hire such persons. The office naturally becomes, to a certain extent, a great intelligence office, and the cases are innumerable, within my own knowledge, where individuals have been accommodated in this way. The secretary is, of course, in a position to know all the finest stock in the State, and it is an almost daily occurrence that he has occasion to use this knowledge for the benefit of those who seek to obtain information. It may not be any part of the official duties of the recognized officer of the board, but it is, at least, one of the incidents of the position, and one of no small importance to the public.

A society with its public exhibitions of stock, and collections of farm implements, fruits, and farm products of every description, has it in its power to accomplish a good work, and to advance the great interests of agriculture by the diffusion of intelligence among its members and the visitors to its fairs. It brings men together—men engaged in the same pursuits, and eager to learn the best methods, and to adopt the latest improvements and the best appliances. It certainly has the element of association to a certain extent, but lacks sufficient executive power, while it is too far removed from the central civil government to perform the functions which a department or board of agriculture is organized to perform. And hence most European Governments have been formed with reference to this difference, with a strong and efficient department of agriculture, sometimes known as a board or bureau, and sometimes as a ministry. Thus Prussia has its "minister of agricultural affairs," who has the general oversight of innumerable agricultural societies, agricultural colleges, and agricultural experiment stations, partially supported by government aid, but very largely by the people. It has also what may be called a State economical college, a sort of agricultural statistical department, composed of the heads of the various ministerial departments, and of practical agriculturists. Its system of agricultural development is more complete, probably, than that of any other country, and its practical results are commensurate with its efforts.

France, also, has its ministry of agriculture, commerce, and public works, and has created numerous agricultural schools, agricultural societies, and commissions for the encouragement of agriculture. The ministry of agriculture has under its control the improvement and perfection of the methods employed in farming, and the management and instruction of agricultural and veterinary schools. The responsibility committed to this ministry is so extensive that its work is subdivided into several sections or bureaus, one of which is called the Department of the Secretary General, and with this is united a special bureau called a "Chamber of Accounts," really a depository of agricultural accounts and statistics, charts, and plans of agricultural improvements. Another section has charge of agricultural and veterinary instruction, of financial and other aid or assistance for the encouragement of agriculture, and of legislation relative to the sources of subsistence, and so on.

Belgium, also, the model of rational and progressive agriculture, has its department or board of agriculture, with its thirty agricultural societies and numerous commissions, and the culture of the soil and cattle breeding there have attained so high a degree of perfection that, in proportion to her area, no country in Europe can exhibit so large a productive power.

These examples, with numerous others that might be mentioned on the continent of Europe, are sufficient to show that Governments of the longest experience have sought the most effective means to make the national political power felt in the practical development of their material resources, and the results in every case clearly establish their wisdom.

The governments of Europe are doing far more, and are employing far more efficient methods to develope, improve, and perfect their agriculture than either our national or State Governments. Not content with innumerable agricultural societies, State and local, by far the larger part of which receive more or less State aid, or with very numerous agricultural colleges and schools devoted exclusively to agricultural science and farm practice, or with something like eighty scientific experiment stations, wholly devoted to investigations in agriculture, they crown the system of State aid, by giving the agricultural interest a direct and powerful influence in the central government, and an official dignity which is nowhere recognized in this country.

The result is a more complete and perfect system, a wider spread intelligence in rural affairs, and a more powerful influence of science in its relations to the soil with far greater practical results than anything we can show. We shall need to develop a far more liberal and generous spirit towards this great interest, a more realizing sense of the importance of scientific investigations, and a more imperative demand for universal intelligence, before we can claim to have heeded the advice of Washington, or to have done our whole duty in our efforts to develop the possibilities of the production of human food.

CORN CULTURE, AS TAUGHT BY WAUSHAKUM FARM EXPERIMENTS.

By E. LEWIS STURTEVANT, M. D., SOUTH FRAMINGHAM, MASS.

Calculated results, while usually having little absolute accuracy, as meeting the facts in a given case, yet oftentimes offer a valuable illustration, and thus we commence our short essay in this way. We will calculate the possibilities of the corn crop, provided only the skill and knowledge of the farmer were equal to raising each plant so that it might be the equal of every other plant in the field; an easy condition on paper, but how impossible in practice we all know.

An acre contains forty-three thousand five hundred and sixty square feet. If we mark this area off in hills four feet apart, we have sixteen square feet to a hill, and two thousand seven hundred and twenty-two and a half hills to an acre. In Connecticut, this September, we saw stalks of a Tennessee corn bearing eight ears, and we find that the smallest of these eight ears of last year's crop weighed three thousand two hundred and seven grains. Eight ears weighed, therefore, at the least, twenty-five thousand six hundred and fifty-six grains. A pound contains seven thousand grains. Therefore, this one stalk furnished at the least three and two thirds pounds of corn on the cob, or, in this case, two and nine tenths pounds of dry merchantable corn, estimating against the fact as we may. If we had but one stalk to the hill, and each stalk was the equal to the one quoted, our crop would be seven thousand eight hundred and ninety-five pounds, or one hundred and forty-one bushels! If two stalks were grown to the hill, in this figuring, the crop would manifestly be doubled, or equal two hundred and eighty-two bushels per acre.

This statement, as figured, may be accepted as a possibility only of corn culture, and, with our present experience, may be considered an impossibility of field culture, yet to accomplish it, but one little essential is required, viz: to repeat, what we have before stated, the production throughout the field, on each stock of the actual yield of the single stalk.

We think that our illustration must convince that it is indeed necessary for the farmer to understand something of his crop, how it grows, upon what its growth depends, how it fruits, and on what conditions its fruiting depends.

In our experimental practice on Waushakum farm, we have produced astonishing results from a single hil', and from a single plant; yet when we have attempted the large yield in field culture, we have had to be satisfied with one hundred and twenty-three bushels of shelled corn to an acre, while we have been certain that only lack of the essential knowledge and opportunity have prevented the achievement of our hopes—a two hundred bushel yield.

In the growing of corn, we have certain elements of success absolutely within our control; *i. e.*, the fertilization of our land, and the tillage. We can, if we ignore the expense, supply to our land the fertilizer equivalent to ten thousand or ten million bushels of yield; we can, if we choose, stir the soil daily, preceding and during growth. Yet, not knowing the absolute conditions for success, we find that the increase of crop is neither proportionate to the manuring nor to the tillage. Hence, we must seek further for the conditions than mechanical and artifical conditions. Is it water? Undoubtedly, if we spare not expense, we can control the water supply, and by seeking the proper soil, and applying carefully the requisite moisture, can obtain large results; but even with this resource, disappointment will come to our plans, and we will find it difficult to realize our expectations. Is it the seed? We here begin to see a glimmer of light. If we select two kinds of seed, the one from a crop of known excellence, and another from a crop of known wretchedness, the conditions otherwise for the harvest being equivalent, we will find, that although planted side by side, there will be a large difference in the result of their growth on our fully fertilized fields. From the one a large crop, from the other a smaller crop will be harvested. This, the exaggerated expression of results of actual trial, discloses the fact that there is a heredity in seed, as with animals, and that as good cows are expected from good parent animals, thus good seed is to be expected as the produce of good seed.

This fact of the heredity of seed is the most important of the essentials to a maximum crop to be grown by an intelligent farmer, as being further from individual control, and as influencing the crop through all the vicissitudes of farming customs, and all the various operations of manuring or culture. Does tillage influence the crop for good? Unquestionably; but the good effect when practiced on good seed is far in excess of that noted when applied to the product of seed of a barren inheritance. Does manure affect the crop? Certainly it does; but equal quantities of application produce different crops from the different kinds of seed. If the hereditary fruitfulness of seed corn be indicated by the figures 50 and 100, the same application of manure which will produce a hundred bushel yield from the one seed will pruduce but fifty bushels from the other.

From these illustrations it will be seen that the writer ascribes maximum crops to the combined influences of good seed, high fertility of the land,

and tillage operations—the three combined—and the most essential, as being the most difficult to attain, is the seed.

Something more is, however, to be said. There is required a knowledge of the effect of the various operations of culture, each a power for good or evil, and whose resultant, the crop, is to be attained through the coördinate acts of all the influences, which must be compelled to work toward this end, through the intelligent interference of the farmer.

It is but necessary to refer again to the importance of seed of an inherited fruitfulness, and to say that this must be attained through the judicious use of the principle of selection, for our limit will not allow of our pointing out the principles, or general laws, which are proved to apply. The good farmer must look to *seed selection* as the means for his improvement in crops; the improvident and poor farmer must look to common methods of applying fertilizer and tillage, in order to improve into a condition when he too can seek maximum results to be gained by seed selection.

In manure we have a means for forcing growth, when applied to land in the proper physical condition for the reception of crops. If we apply too little for the use of corn, then a poor harvest is the result. If we apply a larger quantity, yet not too excessive, the crop is increased, but not proportionate to the increase of the manurial application. Thus, if twenty loads of dung will produce fifty bushels of crop, it does not follow that forty loads will produce one hundred bushels, or eighty loads two hundred bushels, any more than if twenty tons of coal will force a vessel twenty miles an hour, forty tons will enable a speed of forty miles an hour to be attained. (This is an illustration only, and we wish to caution against seeking an analogy between these statements.) If we apply an excessive amount of manure to our corn, we may find that the crop is not only not increased, but even lessened thereby, over what might have been obtained by a less amount, the extra feeding developing expansion of leaf instead of increased determination towards fruit.

Intercultural tillage, or the stirring of the interspaces of the crop, has a double action. It acts to prevent the moisture from evaporating from the soil by furnishing a mulch of fine earth, and it also has a physiological action on the plant by breaking the roots and interfering with the habit of the growth. As we have developed the "new theory of tillage" elsewhere, we will not dwell upon this point, but simply state that intercultural tillage is not so universally beneficient in its action as has been supposed by some, but requires intelligent use in order to produce its good effects. It acts to check the growth of the plant and to turn the forces of vegetative or leaf growth into those of grain-bearing or seed growth. If the land is so poor that it cannot do more than support the growth already on it, then there can be no obvious advantage to determine the plant towards a larger fruitfulness than it can appropriate the plant food to mature. If the root cutting is to check a plant already of depressed vitality, it is most judicious not to apply it. If the plant is struggling for existence against physical disadvantages, it is idle to expect marked improvement through a process which does not change those physical conditions, and certainly does act to injure the growth. What, then, is the object of intercultural tillage? It is the weapon of might for the good farmer who has rich lands, and good tools, and good seed. It is a power in his hands to offset natural conditions (beneficial to the natural plant, it may be, but which work against the artificial habit of the plant required by heredity to furnish a yield beyond the needs of the natural condition,) by those other equally natural conditions which tend in the direction of the farmer's needs and hopes. Through the use of root pruning, by means of the horse-hoe, the farmer can manure highly and get a remunerative return; he can manure excessively, and attain a larger crop, because the plant food which otherwise would encourage rampant leaf growth, is compelled, through the physiological interference with the plant, to work in the direction of grain-bearing. It aids the vigorous plant to transform its elaborated product into seed-bearing organs, rather than into the growth organs, and encourages the plant-food supply of the soil by influencing its manufacture into products more valuable than the leaf. Tillage, however, must be intelligently applied, even under these favoring circumstances, and the good farmer must study the effect carefully, in order to produce the certain results.

This may be an interesting theory, and may be dull reading, yet the experience gained through careful trials on a small and on a large scale, all point in the direction of value to these statements, and if large yields are to be the rule, these or similar ideas must gain currency and receive attention and discussion; for it is neither seed alone, or manure alone, or tillage alone, which is to furnish maximum crops as a constant farm result, but the judicious combination of the three, together with a careful attention to those other details of practice which are so well understood by good farmers.

It does not concern the farm practice to discuss how the *largest crops* can be grown, irrespective of expense, in the business of farming. As the farmer is a business man, and depends on his farm for a living and for his means, the important question for him is the how to grow the *largest profitable crop*. We, hence, do not wish to be understood that we advocate the attempt to raise crops under conditions that cannot possibly admit of profit, but we do wish to be understood that we believe the yield of our corn and other crops can be largely and profitably increased over what they are at present, through the use of principles rather than empirical practice. We will not discuss deep or shallow plowing for corn, for to do so would be only to discuss methods, and not results. We desire our land to be permeable to the roots. We care not how it is made so, provided it is accomplished in the least expensive way. We shall not advocate the interculture of corn, except as a means for modifying the soil and the plant, and if, in practice, these modifications were not needed, then tillage would be unprofitable. We do not advocate dung or artificial fertilizer, but only a supply of a sufficient quantity of plant food to accomplish the result in the cheapest way. We do not advocate thin or thick planting, but only that method, depending on the seed and on the culture, which shall result in the largest number of ears which are to supply the largest number of bushels of corn. In a word, the growing of corn is dependent for success on many conditions, and we advocate the application of such principles only as shall produce, in a given case, the largest and most profitable return; and if conditions vary in a locality, then our practice must vary in order to cause these conditions to conform to the principles; for principles, well founded on observation, cannot fail. If failure comes, it is from our own misunderstanding in their application.

How to Grow Corn.

We will assume that the farmer is a good one, and that he has a soil sufficiently porous, either naturally or brought about by the deep cultivation of crops preceding corn in the rotation, and shall assume that the land is well drained, and fit for the growth of corn.

1. Plough the sod shallow. This because the most fertile soil is near the surface, and the corn feeds near the surface where the temperature is the highest. The corn plant is tropical in its nature and loves heat, and cannot well have too much of it. In the case of corn growing in the southern States, this rule might, in certain cases, require modification.

2. Harrow thoroughly into a good seed bed.

3. Apply sufficient manure broadcast. The best plan, the one which the good farmer pursues, is to have the land in a good condition of fertility; if the land is well nigh exhausted, the broadcast rule might require modification. If fertilizer be used, apply this also broadcast, and use as much as a good judgment justifies, keeping the calculation of profits, as based on previous experience, well in mind, remembering that too much is less wasteful than too little, but that the golden mean has been sung by poets, as well as advocated by successful farmers. What that mean is, each one must decide for himself, but if the land is in proper heart for successful culture, apply the quantity of plant food that has been removed by preceding crops. If, for illustration, we consider the plant food of the soil as a fixed quantity, first get your land in maximum condition, (*i. e.* just saturated with the element plants feed on) and then apply just sufficient to keep it in this state.

Keep this manurial application as *near the surface* as possible, just covering with a light harrow.

4. Mark and plant the field. The distance apart must be governed by the habit of the variety of corn grown. A tall-growing variety will require more space than a dwarfer variety; but remembering that the foliage can be kept down by the process of interculture, (*i. e.* root pruning.) plant as close as you dare, because the more stalks the more the opportunity for ears, provided the planting is not so close as to check their development through shade. Remember also that a closely planted field uses more of the water from the soil than a sparsely planted field, and that in a location subject to excessive droughts, thin seeding has a preference over thick seeding. Remember also that a variety of strong hereditary fruitfulness will endure closer planting than a less prolific variety; and don't forget that the thicker a field is planted the greater the necessity for abundance of plant food.

What directions do we offer concerning choice of seed? Select the best you can find. If another farmer's seed is more prolific than your own, get that; but *in all cases* give preference to seed of equal quality, which is fitted and acclimated to your locality.

5. As to the interculture, these other conditions being complied with, commence early, *go deeply*, as *close* to the plants as you dare, don't fear injuring them if they will stand upright after your culture, and go *frequently* up to the time of the first appearance of the tassel. Now keep the tools from the field, for interference with the roots after this period, so far as present experience obtains, is injurious.

6. Cautions. In case of severe drought, don't trouble the roots by cultivation, for the drought is producing the check that you desire, and more might be unfavorable to the plant. Don't destroy vigor of growth, but change its direction. If the corn is suffering from want of water, cultivate shallow, and often, to furnish a mulch of fine earth which shall protect the soil water from evaporating, and thus conserve it for the plant. If you think that more fertilizer is desirable, on account of exceptional favorable seasonal, and climatic influences, apply so as to cover it with soil during the hoeing.

THE OAK PRUNER BEETLE—(*Stenocorus villosus.*)

By Prof. W. A. BUCKHOUT, *Entomologist of the Board.*

The structure and habits of this insect have been explained with considerable minuteness by several authors, particularly by Prof. Peck and Dr. Fitch, of New York, but, as these accounts were published many years ago, and are now hardly accessible to residents of our State, I have deemed it not amiss to call attention to the subject again. Moreover, it is an excellent example of our "long-horned" wood-boring beetles, and is an admirable object for the beginner in the study of insects to observe and note. From a considerable experience with persons who have no knowledge of the nature and habits of insects, I am convinced that a little guidance and instruction in a few cases of this kind will open their eyes to the wealth of insect life which is about them on every hand, and will enable them to understand intelligently many of our injurious and beneficial insects, so as successfully to combat the one and encourage the other. To many persons, we may say, all insects are alike foes, but we need to realize that there are both friends and foes, and, though associated together, that we can generally separate them.

Prominent among the injurious kinds are those which bore or mine through the bark or wood of trees. Their number is legion, and in their habits there is likewise great variety. The particular one which I have chosen to describe is among the easiest to distinguish, and, being pretty widely distributed, can be found in almost any woods, especially if it contains many oak trees. As its common name, "oak-pruner," indicates, it prunes or lops off the branches of oak trees, not, however, in a way that would please the owner of the trees; for the branches cut off are often the best and thriftiest that can be found, and if the number of insects be great, the beauty and symmetry of the tree may be very much injured. Fig. 1 shows a branch which has suffered such amputation four times. The result has been not only to stunt it, but to change the direction of growth. The tree from which this illustration is taken has suffered very much from this cause, and would at once attract attention by its stunted appearance. When the part thus cut is the leading shoot of a young sapling, the tree is deformed for life, and also very much retarded in its growth. That these branches have been cut and not broken off can be very plainly seen; for, if their severed ends be looked at closely, either with the naked eye or with a low magnifying glass, it will be seen that they are neither cut off smoothly, as with a sharp blade, nor are their fibers torn asunder, as when a branch is broken by the wind, or a heavy weight of snow, but they will be found covered over with short and shallow depressions, slightly curving, and looking as if made by a very small gauge. Indeed, the jaws of the insect are the gauges which plow out, little by little, the woody fibers, until the branch is severed, or nearly so. If the branch be large and heavy, then more or less of the woody fibers are left undisturbed, since if all were cut away the branch would fall at once, and not only endanger the life of the cutter, but defeat the object for which the branch is apparently cut, namely, that of serving as a living place while the changes incident to insect life are being undergone. But small branches will be found to have all the wood cut away except a few fibers or a line of them next the bark. Very small branches will be found cut away quite to the bark. Figs. 2, 3, and 4 will show the appearance of the cut ends of branches of different sizes. Besides these peculiarities of cutting, which, of course, are in some cases obscure, all branches which have been severed by this insect, will be found to have an oblong or circular hole leading from the cut face back into the branch. This hole generally lies a little out of the center in a slight hollow, and, in branches freshly cut and containing an insect, it is stopped up with a coarse dust from the wood fibers. If these points are carefully observed, no one need be at a loss to find such branches, or to distinguish them from broken ones, or from such as are cut by other insects, for this is by no means the only "pruning" beetle.

If one of these branches be slit lengthwise, as represented in Fig. 5, the insect and its burrow will be exposed, and we shall be able to understand why the branch has been cut. If the branch be thus examined in late summer or fall, the insect will be found, in what is known to entomologists, as the larva, or grub form. It is represented separately in Fig. 6. It has a yellowish white, worm-like body, about half an inch in length, divided up into about twelve rings or segments. The head is harder than the rest of the body, and is furnished with short jaws sufficiently strong to cut or gnaw through the hardest of wood, though knots are generally avoided by them. In soft wood they make more rapid progress, and I have there found the largest larvæ, which were over three fourths of an inch long. The rings immediately succeeding the head are the broadest in the body. They gradually diminish in size, though those near the last are often somewhat enlarged. If examined with a glass, many minute reddish hairs will be seen, especially about the head. The larva, at the period of the year mentioned, is still actively engaged in cutting its way on into the branch. The dust and cuttings are pushed backwards, to further block up the opening upon the cut end, or are thrown out, through an opening in the side, when the burrow, for any reason, is carried so near to the bark as to cut slightly through it. How came this larva here in the first place? This is a fair question, and we shall try to answer it.

In Fig. 5, there is seen a small side branch, in which is a burrow leading to the main one, which contains the larva. This side branch, or the stump of it, can almost always be found quite near to the point where the main branch is cut off. It was upon this that the egg of the insect was laid—upon the young and tender part of this side branch, or of a leaf growing upon it.

As soon as the young larva issued from the egg, it began to bore downward into this small twig, extracting the nutrient matter from its fibers, and increasing in size as it descended. The twig thus becomes hollowed out, until there is but a thin shell of bark and wood left. This often breaks away, but the stump of it, or the opening from it, into the larger branch, can generally be distinguished. Arrived at the main branch the larva bores downward, toward the trunk of the tree, generally an inch or two below the place of entrance, before it begins the process of cutting the branch crosswise. Having reached a point favorable for this purpose, it begins to cut at right angles to its burrow, and transversely to the fibers of the wood. With an apparently marvelous knowledge of just what amount of cutting is necessary in each particular case, it leaves just enough uncut to support and hold the stem in place, until it shall have retreated out of harm's way. The cutting of the branch having been accomplished, the larva retreats into the burrow, closes the opening with bits of wood, and proceeds leisurely to continue running the burrow upward, beyond the point of entrance. But the nearly severed branch is soon detached

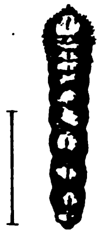

Fig.6.

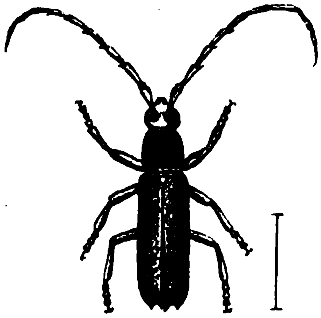

Fig.8.

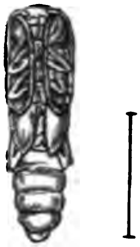

Fig.7.

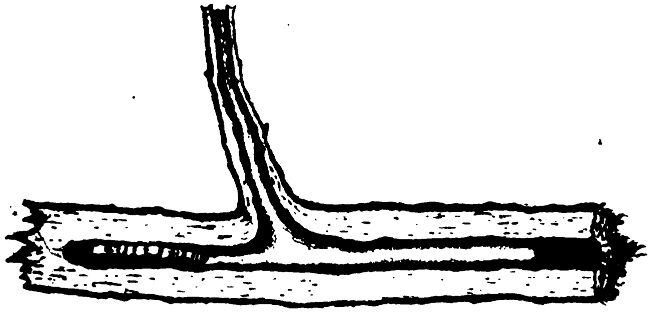

Fig.5.

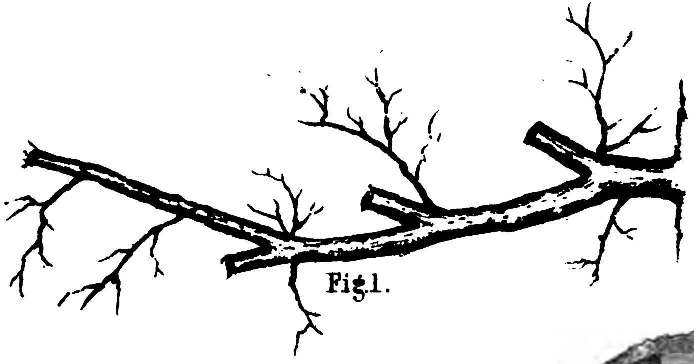

Fig.1.

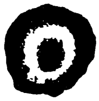

Fig.2.

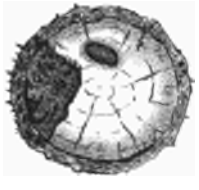

Fig.3.

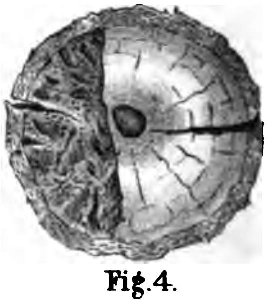

Fig.4.

THE OAK PRUNER BEETLE
(*STENOCORUS VILLOSUS.*)

by the wind, and, with the contained larva, falls to the ground. Here it remains, half covered, perhaps, among the fallen leaves, and by the winter's snow. During this time, the larva has acquired its full development, and has changed into its second form, that of the pupa.

In this form, represented by Fig. 7, the worm-like nature is largely lost, the body changes very much in shape, becoming shorter and more compact, and the different regions are more sharply separated from one another. The cutting jaws have disappeared, and, though not entirely motionless, the pupa lies comparatively quiet, while the peculiar changes, which are to give it its adult form, are going on. At first are dimly outlined and shown the future wings, legs, and antennæ. These become plainer and plainer, the skin changes several times, till finally it assumes a brown color, and the beetle is mature. We now have the adult insect, for which all this peculiar work has been preliminary. Flying about among the oak trees, it may be found in June, but, being small and dull-colored, it is not especially noticeable. Fig. 8 represents an average specimen, twice magnified. It is about half an inch long. Its general color is a dark brown, approaching black, somewhat darker below, and covered all over with ash-colored patches. These, when examined under a glass, are seen to be made up of short hairs, which caused Fabricius to give it is specific name, '*villosus*'—hairy. The antennæ are about as long as the body; they taper slightly to the tips, they joints are conspicuous, and the second, third, and fourth, have short spines upon their outer edges. The eyes are large, compound, and curve about the basal joint of the antennæ, so as to be lunate in form. The thorax is nearly cylindrical, widest in the middle, and tapering slightly to both ends. It has not the lateral spines which are so characteristic of a number of nearly related beetles. The elytra, or wing-covers, are pitted with many little punctures, as though they had been pricked with a pin. At their free extremities they have two short spines, which can plainly be seen in ordinary specimens, especially if the elytra are gently separated from each other. The wings proper are folded up underneath these covers, except when they are thrust out to be used in flying. The legs are not noticeably different from those of other beetles. The thighs are somewhat swollen and often spinous tipped, altogether the mature beetle is a very modest, harmless looking insect, and a novice would hardly expect that it was able to do any injury whatever, but an entomologist would at once see the characters of the wood-borers, and suspect some such habit as I have described.

In general they seem to prefer the black, red, and scarlet oaks, but the cut branches may be found from all species of the oak, also very frequently from the hickory, the different species of maple, cherry, apple, and peach. Without making any special search, I have picked up branches from each of the above, and probably almost all of our deciduous trees would furnish specimens. In the white and Norway maples they seem to thrive to a wonderful degree. One larva bored for fifteen inches in a maple stem, and one branch, which had been cut from a white maple, was eight feet long and an inch and an eighth in diameter. After these maple stems are deadthey are often attacked by the "carpenter ant," (Formica Pennsylvanica) which cuts long, sinuous, and shallow grooves through the stem, generally just underneath the bark. Such channels should not be confounded with the work of this beetle, for the latter is internal, that of the former external. Apple trees, which are near oak woods, are very liable to be disfigured by the oak-pruner.

It does not seem to be any more abundant one year than another, and it can hardly be said that it is so abundant as to cause as great injury as do many other insects, but we never know when an obscure insect will rise up to vex us, or which of the many it will be, some of its near relatives are already among our most injurious species, the apple tree borer for instance, about which so much has been written, and the young people who would like to know something of insects and their habits will find this a very good one to hunt for and observe. Go into the woods or, better still, along some road beside which oak trees are growing and pick up a number of the branches which are marked in the way described. Carry them home and cut open a few to see the worm and its burrow as in Fig. 5; put others in some safe place, and late in the winter or in spring you will find in them the pupa form as shown in Fig. 7. Take still other branches, cut them off sufficiently high up to be sure of having retained the worm, and place them in a close box, so that when the full grown beetles escape they will not be lost, some day upon lifting the lid you will find the beetles running about, anxiously looking for some twig upon which to deposit their eggs, and thus start another cycle like that whichhas been described. You will thus have a practical demontration of one of our wood-boring beetles, and you can probably suggest the most feasible remedy for this particular case, namely, the collecting and burning of these branches with their inclosed larvae.

THE APPLE IN PENNSYLVANIA.

By JOSIAH HOOPES, *Pomologist of the Board.*

Whether the apple crop in our State will prove remunerative, is a question of too much importance to settle hastily, although there are many excellent cultivators who advocate the negative, and who possess convincing and plausible arguments to prove their position. But examples of this character do not prove the apple a failure, by any means, so long as we can find sections of our State where it will succeed, and pay a handsome percentage on the investment. The whole secret of success, if any such there be, may be stated as follows: A thorough knowledge of the art of cultivating properly; a discriminating judgment in the selection of varieties; and a practical experience in disposing of the crop. We may all have our own ideas how to carry out these features successfully, and we may take widely different paths in so doing, but the end must be the same.

Perhaps, the most important question to solve is that of varieties, for any careful farmer is fully alive to the necessity of çultivating his trees when young, notwithstanding he may act contrary to the usual recognized orthodox rules. On the contrary, there are very few orchardists who adhere strictly to the few varieties which are known to succeed in their respective localities; the temptation to introduce other kinds with excellent reputations elsewhere, and that are of superlative excellence, will often cause the planter to commit an indiscretion, which he will never cease to regret. Reason as we may, the two motives that we have in view when setting an orchard—whether for market or home consumption, are really antagonistic. The amateur collection is comparatively useless for profit, and which of us would be satisfied with the one or two varieties that pay, especially should they be of doubtful quality? There are many varieties that no orchard should be without, as for instance the early Joe, mother, summer pearmain, &c.; but they will not pay excepting for one's own private table. We must not be too squeamish in regard to the quality of our fruits for market, the idea that some writers entertain about cultivating the taste of the consumer, sounds well in theory, but self-interest will govern the actions of the purchaser in the future, as it always has in the past. As an illustration, let us take the Smith't cider apple, a variety that no one attempts to praise as first-class fruit, and yet when well grown and ripened, it sells without any difficulty; and as it can be disposed of at a much lower price than any of the rich highly-flavored kinds, both the buyer and seller are mutually pleased. No one is deceived, for there is nothing better to take its place in some sections of the State.

It has almost passed into an axiom in fruit culture, that the best paying varieties are of inferior quality; notably, the above variety among apples, the little blue damson among plums, the early Richmond among cherries, the Concord among grapes, the Wilson's Albany among strawberries, &c., &c. In a recent report on apples, compiled from the selections made by some two hundred reporters to the secretary of the State Board of Agriculture, it is somewhat bewildering to the youthful planter, when doctors disagree so widely, to determine what are the most profitable varieties after all. But, when we consider the immense area of our State, its great diversity of soil and climate, as well as the cost of transportation to market, in sections remote from our larger cities and towns, a cause for this diversity of opinion can readily be explained. Whilst the north-western counties agree with our sister neighboring State that the Baldwin, greening, northern spy, Roxbury russet, &c., are the most profitable apples to plant, orchardists residing in the south-eastern counties will say that the above list is comparatively worthless with them, as the fruit will not remain on the trees until cold weather. They select the Smith's cider and York imperial above all others. In Bucks county especially, the former of these two is being planted in immense numbers, to the almost total exclusion of other well known kinds. In York, Adams, and Lancaster counties, the York imperial is the winter apple *par excellence* for that region, and, where it has been tested in adjoining localities, it is meeting with similar favor. The best advice to give a young orchardist is to plant sparingly of early varieties.

There are so many difficulties to overcome, in the way of disposing of the crop, especially when the market is well supplied with peaches, pears, and, in fact, almost every variety of fruit, that one is pretty sure to become disgusted with the business. And just here is where money may be realized by a close proximity to good markets. The man who can display beautiful specimens of red astrachan, Jefferis, Porter, or any of the leading strong summer and autumn apples, can dispose of them at a respectable price, and, if he has a good reputation for fine fruit, there can be no doubt he will make them pay him a fair profit.

The preparation of fruit for market is essential to success. No greater mistake can possibly be made than to place a layer of fine large fruit on the top of the basket, whilst the main body of the contents are inferior in quality. It may answer a few times; but, a damaged reputation never will succeed in the long run. The old truism, that "honesty is the best policy," is remarkably applicable here. Young men, you who are about entering upon your business life, and who intend giving the raising of fruit your preference, remember that it is an utter impossibility to succeed, unless you, at all times, endeavour to give your customers a better article, if such be possible, than they believe they are receiving. In other words, put your inferior fruits on top rather than in the bottom; but what is better yet, of two evils choose neither. Assort your apples into three distinct classes, and you will receive more money for your crop than by any other method. Your "extra selected" specimens will always sell whether fruit is plentiful or not; your good medium quality will look the better for being uniform, and can be disposed of in preference to mixed lots; whilst the inferior grade, the cullings, as it were, look precisely what they are intended to be, and must take their chances, which will be governed by the condition of the market. Too much care, also, cannot be exercised in picking the fruit, as the least bruise, or even abrasion of the skin, causes it to discolor, and speedy decay will be the consequence. The practice of rubbing the skin of apples with a woolen cloth should be discouraged, unless they are intended for exhibition purposes, or for immediate use. It is a well authenticated fact, that the less we handle our specimens, the better they will keep and carry to market. The bloom should never be injured, if it be possible to avoid it, and especially on such varieties as the red astrachan, as this is one of its greatest charms.

Early apples should be taken from the tree before they are fully matured. If left until after this critical period they are liable to acquire a mealy dry flesh. If not marketed at once, they require to be placed in a thin layer on shelves, in a cool dry apartment. Use every effort to establish a reputation for furnishing extra fine fruit, and never fear for the result.

The late proprietor of the justly celebrated "Knox Fruit Farm," located at Pittsburgh, in this State, considered this the great secret of his success, to raise fine fruit, and then put it upon the market in the best possible condition.

There is such a wide diversity of opinion regarding the proper methods of cultivating an apple orchard, that to recommend any one system as infallible would be untrue.

It is presumed that every intelligent enterprising orchardist aims to secure a strong, sound, healthy growth, and a full crop of perfect apples. The two main points of difference in cultivation, for they are both examples of culture, and good culture at that, may be stated as follows: The first, known as "mellow ground," in which the surface is kept continually stirred every season for a long term of years; and the other known as "grass culture," where the land is seeded to grass. At first sight these systems would seem diametrically opposed to each other, and that they would cause exactly opposite effects; and yet such is not the case when they are properly understood and judiciously performed. Indeed, instances of both these systems within a few miles of Philadelphia, afford ample proof that either may answer. That the so-called "grass system" combines several elements of success, no one can gainsay, ridicule it as we may, in other respects. The friends of this method claim the following points: That an orchard in grass, when kept mowed, and the grass allowed to remain as a mulch, will preserve the surface of the soil cool and moist, a condition that is highly advantageous to the trees' growth and health. By applying an annual supply of plant-food of whatever nature we approve, directly to the surface, we thus place it at once in the immediate vicinity of the small feeding fibers, which are close to the sod, in search of fertilizing material.

These small fibers, which are the vital organs of a healthy tree, are never injured as in the case of an orchard where the plow and cultivator are constantly employed. It is a well established fact, that constantly stirring the soil will cause a strong, and, in many instances, a succulent growth of wood, which is by no means a desirable condition for a tree that we desire to pass safely through the winter. On the contrary, when the roots are allowed to remain undisturbed through the growing season, the new formation of wood is less vigorous and more healthful. Although nature is not always the best of teachers, still from her method of cultivation we may draw safe conclusions. The absence of stirring the soil, the annual mulch of leaves, grass, or small plants, which preserve the soil moist and cool; and the fertilizing material which is applied on the surface for the fibers to take up, all form instructive lessons.

As before stated, there can be no undeviating rules laid down for our young orchardists to follow, as some of our best cultivators adopt diametrically opposite systems in their orchards, all looking to the same end. At all events, do not neglect your trees; cultivate them carefully and thoroughly; be satisfied with a good crop of fruit, and do not repine because you cannot have a crop of grain as well from the same inclosure. When your fruit is mature, pay attention to it, as its value is certainly equal to to your other farm crops if properly handled. In short, plant plenty of trees, and then take care of them.

EXPERIMENTS ON THE EASTERN PENNSYLVANIA EXPERIMENTAL FARM.

By John I. Carter, *Superintendent.*

To the Pennsylvania Board of Agriculture:

Gentlemen: As the collection and dissemination of agricultural statistics, and of facts and experiments throwing light upon agriculture, iminently belongs to your department, I presume to offer you a few notes of trials and experiments made on the eastern experimental farm during the present season.

We have heretofore suffered for want of a prompt and effective means of laying the results of the work of this farm before our farmers, and have thus felt discouraged, not only in attempting to report our experiments, but in making as many as we otherwise should have done.

We are now hopeful, that through your quarterly and other reports we shall, with your consent, be able to reach all interested farmers. We also hope, that by showing the character of the work done here, to incite among farmers such an interest in these experimental farms as will not only encourage us, but eventually redound to the profit of the whole people of our State.

The knowledge of agriculture has been largely made up of experimental gleanings, and there is no more fruitful source of reliable information for the farmer than that obtained from carefully conducted and honestly reported experiments.

This is the great purpose of these farms, and the sooner our farmers understand this, and see that these farms are fulfilling this purpose, and the results made available, the sooner they will assume the importance they deserve.

Without further preface, I will give the result of our attempt to raise the new soiling plant,

Prickly Comfrey—Symphytum asperrimum.

April 13, 1877, we planted a few root cuttings on good, strong ground, well manured. The cuttings were small and dry, and being planted deeply, came up slowly and feebly, but by fall, had become well established, though through the summer they had not made sufficient growth to warrant cutting.

This spring (1878) the plants started off vigorously, and on May 13, we cut an average stool, that weighed six pounds. On June 25, we re-cut the same stool, making five pounds, and on August 6, it made twelve pounds, or twenty three pounds in all. If the hills were four feet each way, at this rate it would yield about twenty seven tons of green fodder per acre.

The lower leaves fall on the ground, and are liable to get dirty, and as it grows in bunches is not handy to cut. The leaves are coarse and prickly, and rather unpleasant to handle. It is very succulent, and dries away about eighty-three per cent. in curing. Cows and horses refuse to eat it without a severe course of education by starvation. Pigs, however, are quite fond of it, and it might prove of some value to feed to confined hogs. We could not, on the whole, recommend its adoption as a soiling plant, especially as it certainly would be difficult to plow out, and might be very troublesome to eradicate.

The American Jute.

We planted the seeds of this plant, and find it to be a common noxious weed, sometimes called Indian Mallows, Abutilon Avicenniae, belonging to the order Malvaciae. It makes a strong growth, reaching to a heighth of five or six feet, and would, no doubt, yield five to ten tons of stalks. We had no way of testing its quality as a fiber yielding plant, but if your department think it desirable to have a thorough trial of its yield and quality of fiber, we will try to raise a sufficient quantity to admit of gathering and preparing as hemp or flax.* As, however, the seed pods ripen irregularly, it will be difficult to prevent a dissemination of the seeds, and may eventually involve some trouble to eradicate.

Testing Varieties of Wheat.

We herewith report the following experiments, comparing varieties of wheat, and append some descriptive notes.

The eighth acre plots were laid out on wheat stubble ground, that was plowed immediately after harvest. At the same time we plowed under a light dressing of mixed fertilizers. September 28, the wheat was sown broadcast at the rate of two bushels per acre, and harrowed in.

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* See report of the Secretary of the Board.

List of Varieties and Results.

KIND OF WHEAT.	Bearded or smooth.	Color of grain.	Time of ripening.	Bushels per acre, 60 lbs. per bush.	Pounds of straw per acre.
Clawson,	Smooth.	White,	July 3,	32.	3,072
Fultz,	Smooth.	Amber,	June 28,	32.08	2,592
White chaff Mediterranean,	Bearded.	Amber,	July 2,	28.44	3,220
Heiges' Champion Amber,	Smooth.	Amber,	July 1,	27.52	1,848
Heiges' Prolific,	Smooth.	Amber,	July 1,	30.40	2,160
Washington White,	Bearded.	White,	July 2,	31.12	2,784
Eureka,	Smooth.	White,	July 3,	32.48	2,960
Gold Dust,	Smooth.	White,	July 3,	31.24	3,000
Glick,	Bearded.	White,	July 2,	28.56	3,832
Arnolds' Gold Medal,	Smooth.	White,	June 28,	31.54	2,552

NOTES.—The Clawson and Fultz have done about equally well for several years. The Fultz is quite a week earlier, and stands up better, but the straw is not so tall and heavy. The Mediterranean neither yields or stands up well. The Champion and Heiges Prolific are two hybrids of the Fultz, from John M. Heiges, of York, Pennsylvania. They have not proved particularly valuable to us. The Champion has quite a light straw. The Washington and Eureka came from central Pennsylvania, presented to us by Joseph Baker, Esquire, of Centre county. The Washington White has a splendid berry, and good strong straw. The Eureka is also very fine, somewhat resembles the Gold Medal, but more productive. The Gold Dust came from the Agricultural Department, Washington, has a nice, white plump grain, and the stiffest straw I every saw growing. The heads blighted some, and it was a little late, otherwise it could be recommended for very strong land or heavy manuring. The Glick is a white and bearded wheat, from near Allentown, Pennsylvania, but of no especial promise. The Gold Medal is one of Arnold's hybrids, nice and white, but not especially valuable.

The following varieties were sown in smaller quantities, and the accompanying notes made:

Arnold's Victor, Colorada wheat, Nevada rye, or Diamond wheat, White rye, Grecian wheat, Louisiana, Roger's, Amber, Kentucky, Deihl, Tappahannock, Muskingum, Arnold's hybrid, Red May, Shoemaker, White blue stem, Michigan amber, Thin bran, Baard, Bengal white, Treadwell, German amher, Russian, White Rogers, Michigan wick.

NOTES.—Arnold's victor came from Canada highly commended, but proved utterly worthless with us, blighting badly, and being quite late. It is a white, smooth wheat.

The Colorada wheat and Nevada rye, or Diamond wheat, was sent us by C. B. Rogers, of Philadelphia. The Colorada was not hardy or fruitful. The Diamond wheat had good heads, of long and almost transparent grains. The straw was not as long as common rye. It stood the winter well, and is worthy of further trial. It might do as a spring crop.

The Grecian is a new white, smooth wheat, largely puffed, but worthless here. The Muskingum and Red May are western wheats of good promise.

The Kentucky, Deihl, Tappahannock, and White blue stem, are white wheats, either to tender or otherwise unsuited to our locality.

The following experiments were made, testing modes of applying fertilizers and cultivating wheat, &c.:

	Bushels per acre.	Pounds of Straw per acre.
Fertilizer lightly plowed under, ...	33.48	4,980
Fertilizer harrowed in surface, ...	29.08	3,420
Wheat cultivated in the spring, ...	24.48	3,160
Wheat without cultivation, ...	31.20	3,820
Wheat sown at the rate of one bushel per acre, ...	33.20	
Wheat sown at the rate of three bushels per acre, ...	34.36	

In the above case, the fertilizer plowed under improves its action, which is our usual experience, and our practice has been to plow under, or drill in, all commercial fertilizers whenever practicable.

Our experiment in cultivating wheat is, as heretofore, unfavorable to this much talked of system. Possibly there is some peculiarity in our soil that renders cultivation for this crop unnecessary. What is singular we can notice no increase in length of head from cultivation, and as there are fewer stalks there must be less grain. The treatment was as follows: The wheat was sown in drills five inches wide, with a space of fifteen inches between, sowing about one bushel of seed per acre. April 20 we ran through the spaces with a one-horse cultivator, and May 3 we ran through with a small sub-soil plow, loosening up the ground thoroughly, finishing up with a Heximer hoe. The clover was sown after the last dressing, and both clover and timothy have made a good stand.

Varieties of Oats.

The following experiments were made to test varieties of oats, products, time of ripening, &c. A piece of stalk-ground was selected for the plots, which was plowed and had a light coat of dissolved South Carolina rock sown upon it, and the oats sown March 28, at the rate of two and one half bushels per acre:

VARIETY OF OATS.	Weight per bush.	Color of grain.	Time of ripening.	Bushels per acre, at 32 pounds per bushel.	Pounds of straw per acre.
Irish oats, ...	29½ lbs.,	White,	July 17,	46.28	4,160
Andre's King oats, ...	26½ lbs.,	Yellow,	July 20,	60.12	5,188
Canadian, ...	31 lbs.,	White,	July 14,	37.8	3,528
Waterloo, ...	22½ lbs.,	White,	July 15,	31.	3,336
White Dutch, ...	23½ lbs.,	White,	July 15,	39.12	3,380
White Schœnen, ...	21½ lbs.,	White,	July 19,	48.16	4,304
Lyell, ...	23 lbs.,	Dark,	July 10,	64.	2,400

The Irish oats is of recent importation, and came to us from Captain Ingram, of Oxford, Pa. It was said to have yielded over eighty bushels per acre, and to weigh forty pounds per bushel. The grain is white and plump, and the straw tall and strong. The Andres King oats came from New York, has heretofore been our most productive variety. It is a long grained, yellowish oats, with a heavy stiff straw. Is rather late, which has been our principal objection to it, but this year its lateness and heavy straw enabled it to tide over the hot, dry weather that was fatal to other varieties. The Canadian, Waterloo, and White Dutch came from the Agricultural Department, Washington. The grains of these kinds were white, plump, and handsome, and last year weighed well, but this year many of the grains were without kernels.

The Lyell oats came from Richmond, Virginia, is a dark bearded oats, with short stiff straw. It was sown several days after the other varieties, and ripened at least a week sooner. It was so early, that it escaped the hot spell, and made a fine yield. The appearance of the grain is the principal objection to it.

Manners of Seeding.

Drilling two and a half bushels per acre, made, ...	13$\frac{16}{100}$	bushels.
The same "as above," with two hundred pounds phosphate drilled in with the seed, ...	20$\frac{24}{100}$	bushels.
Two and a half bushels seed sown broadcast, and phosphate broadcast, ...	15	bushels.
Four bushels seed broadcast, as above, ...	20	bushels.

As before stated, drilling in a small quantity of phosphate with the cereal seeds, seems the most judicious way to apply such fertilizers.

Experiments with Sugar Beets.

In order to test the yield and sugar percentage of different varieties of sugar beets, we selected a piece of ground that had been in potatoes last year. It was manured with pig-pen manure after the potatoes were taken off, and in the following spring, an application of five hundred pounds of acid phosphate per acre, was plowed under. The beets were sown May 24, in drills three feet apart, and thinned to six inches in the row. The beets were kept clean and well worked. One dressing was with a bull-tongue subsoil-plow, run closely on each side of the row to the depth of one foot, mellowing the soil very thoroughly, and enabling the plants, as we believe, to withstand the droughts of the season. They made a fine growth, at anyrate, and were taken up September 30 and weighed. Samples of the different varieties were sent, according to your directions, to Professor H. R. Stephens, of Philadelphia, who returned the following analyses of values:

	Total solids.	Specific gravity of juice.	Per cent. of sugar.	Per cent. of impurities.	Yield per acre.	
					Tons.	*Lbs.*
Silesian, ...	10.0	1.040104	7.26	2.74	22	1,022
Vilmoran, ...	10.0	1.040104	7.07	2.93	17	1,937
Quinlinberger, ...	9.5	1.038032	6.43	3.07	21	471
Imperial, ...	9.5	1.638032	6.76	2.74	23	464
Carter's Prize Nursery, ...	9.0	1.035961	6.26	2.74	20	1,656
Bresleau, ...	7.5	1.029806	4.03	3.47	21	108

It may be worth noting, that, although the yield per acre was twice as large as last year, the per centage of sugar is also greater;* which would seem to indicate that heavy crops are not prejudicial to quality. This agreed with our experience last year, when we noticed that some of the best grown beets were also the richest.

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* As compared with *same varieties* last year.

In the same connection and in the same patch, we made a trial of " Wangaman's vitative compound," testing its effect in expediting the germination of the beet-seed, and upon the further growth of the plant. The seeds were soaked forty-eight hours in a solution of the compound, prepared as nearly in accordance with the instructions accompanying the package as possible, and the seeds planted, as near alike the comparing row as possible, except planted one day later.

The soaked seed came up somewhat sooner, and looked strong and vigorous. After a few weeks there was no noticeable difference in the rows, and when the beets were harvested the following results were recorded:

Soaked seed of Imperial sugar beets, made rate of . . .	19 tons, 1,910 lbs.
Unsoaked seed of Imperial sugar beets, made rate of .	23 tons, 464 lbs.

We do not pretend to account for this somewhat unexpected result, though it was somewhat in accordance with our past experiences in soaking other seeds—to secure a better growth of plants.

Comparing Common Hungarian Grass with Golden or German Millet.

We selected a piece of corn-stalk ground of average fertility, and after plowing, sowed five hundred pounds of acid phosphate per acre on it, and harrowed in.

May 22. The grass seeds were sown at the rate of three fourths bushels per acre, and lightly covered with a spike harrow.

The season was not favorable for a heavy growth. The Hugarian was ripe, and cut August 10. The golden millet was not ripe until August 19, when cut and weighed.

The Hungarian made, per acre, ...	1 ton, 1,584 pounds.
The Golden Millet made, per acre, ...	3 tons, 111 pounds.

The Golden millet is very productive of seed, and, although coarse in the stalk when grown thin and rank, yet with proper seeding and curing the cattle eat it up well, and seem equally fond of it, with, the smaller kinds.

Comparing Varieties of Potatoes.

The ground selected for these experiments was a piece of fallow ground, in beets last year. Early last winter it was manured with a light coat of barn-yard manure, and in the spring, before planting time, was again manured with a coat of pig-pen manure. After plowing and preparing, rows were struck out three feet apart, and an application of five hundred pounds, per acre, of ground bone spread in the rows. The sets were planted fifteen inches apart, and covered three inches deep with a Hexamer hoe.

The planting was done April 9. The potatoes came up well and grew well throughout the season. The patch was kept clean with the hoe-harrow and hoes; and when the plants were two thirds grown, we ran a bull-tongue subsoil-plow by the side of each row, loosening the soil a foot or more deep.

The potatoes were dug August 27, and the following notes of growth, character, and yield recorded.

VARIETY.	Time of ripening.	Height of top, and character of growth and leaf.	Shape of tuber.	Percentage of small ones.	Character of eyes.	Color of skin.	Color of flesh.	Quality.	Yield per acre. Bushels.	Yield per acre. Lbs.
1. Extra Early Vermont,	August 1,	18 inches, strong growth,	Round, flat,	8.0	Shallow,	White,	White,	Medium,	249	38
2. Carpenter's Seedling,	August 1,	16 inches, medium growth,	Long, flatish,	8.0	Shallow,	White,	White,	Good,	151	31
3. Victor,	August 25,	28 inches, vigorous,	Round,	2.0	Shallow,	Purple,	Very white,	Very good,	375	11
4. Beauty of Hebron,	August 5,	16 inches, broad leaf,	Round, flat,	5.0	Shallow,	Light pink,	White,	Good,	216	27
5. Seedling, No. 38,	August 25,	26 inches, very vigorous,	Very long, flatish	10.0	Shallow,	White,	Whiteish,	Medium,	366	32
6. Brownell's Beauty,	August 20,	18 inches, good growth,	Round,	5.0	Shallow,	Purple,	Whiteish,	Poor,	216	20
7. Farmer's Glory,	August 20,	21 inches, very strong,	Round,	5.0	Deep,	Pink,	Very white,	Very good,	242	26
8. Peerless,	August 25,	22 inches, very strong,	Long, round,	5.0	Deepish,	Russet,	Very white,	Medium,	251	44
9. Late Rose,	August 25,	30 inches, very strong,	Long, round,	6.0	Shallow,	Deep pink,	Very white,	Medium,	129	52
10. Seedling, No. 21,	August 1,	12 inches, very poor,	Long, flat,	8.0	Deepish,	White,	Very white,	Medium,	187	35
11. Brownell's Nonsuch,	August 15,	14 inches, medium,	Oblong, flat,	8.0	Shallowish,	White,	White,	Poor,	262	57
12. Compton's Surprise,	July 25,	16 inches, weak,	Oblong, flat,	8.0	Shallowish,	Purple,	White,	Poor,	129	00
13. White Granger,	August 20,	25 inches, very strong,	Round, flat,	3.0	Shallow,	Russet,	White,	Very good,	319	16
14. Excelsior,	August 25,	18 inches, strong,	Round,	10.0	Shallowish,	White,	White,	Good,	248	6
15. Western Reserve,	August 15,	24 inches, strong,	Round,	6.0	Deep,	Light pink,	White,	Medium,	241	40
16. Keystone,	August 15,	18 inches, quite strong,	Long, round,	3.0	Deep,	Light pink,	White,	Good,	285	00
17. Snowflake,	August 10,	18 inches, strong,	Long, flatish,	8.0	Shallow,	White,	White,	Good,	270	21
18. King of the Earlies,	July 20,	11 inches, weak,	Round,	8.0	Shallow,	White,	White,	Good,	144	15
19. Brownell's Eureka,	August 1,	13 inches, leaf broad,	Long, flat,	4.0	Shallowish,	Pink,	White,	Good,	195	50
20. Early Rose,	August 1,	18 inches, medium,	Long, flatish,	10.0	Shallow,	Pink,	White,	Good,	116	50

Fertilizers on Potatoes.

For testing fertilizers, a piece of corn-stock ground was selected, plowed, and harrowed, and struck out in rows three feet apart, and the following fertilizers applied in the row, at the rate of $14 40 value per acre, using equal values of each kind. The fertilers were lightly covered with earth, the potato sets, planted, fifteen inches apart in the row, and covered three inches deep with a Hexamer hoe.

The Victor variety of potato was used in this experiment, and was planted April 22, and dug August 27, resulting as follows:

	Pounds.
Challenge super-phosphate, per row,	197
Stockbridge's potato formula,	254
Preston's super-phosphate,	277
Preston's ground bone,	214
Sulphate of potash,	158
No fertilizer,	95

The Continuing Action of Fertilizers.

In your last year's report, under the head of "Results with Fertilizers," we gave a table showing the continued action of several established fertilizers. We now add this year's results, (1878,) which completes the crop-course, or the five years rotation. As before stated, this application was made in 1874, to corn—no other fertilizer being used during the course.

Equal values were used, except, perhaps, in the case of barn-yard manure, which is of uncertain commercial value. But we used a good coat, such as farmers usually apply for corn.

Number of plot.	KIND OF FERTILIZER.	Pounds of fertilizer applied.	Pounds of corn, in 1874, per ⅛ acre.	Pounds of oats, in 1875, per ⅛ acre.	Pounds of wheat, in 1876, per ⅛ acre.	Pounds of grass, in 1877, per ⅛ acre.	Pounds of grass, in 1878, per ⅛ acre.
1	Nitrate of soda,	20½	481	81	65¼	82	205
2	No manure,	....	396	74½	60½	120	130
3	Sulphate of ammonia,	17	510	80¾	59¾	78	170
4	Barn-yard manure,	...	732	109½	116½	292	240
5	Ground bone,	50	646	105½	137½	364	395
6	Bone super-phosphate,	45	723	115¼	181¼	500	360
7	Mineral super-phosphate,	75	757	118	189	539	500

We do not deem it necessary to repeat, what was said in previous report, in relation to the character and constituents of these fertilizers, or to again carry out the deductions as to profit or otherwise.

Methods of Setting Milk, to raise Cream.

We have made quite a number of experiments, testing various methods of setting milk, such as deep and shallow, high and low temperatures, &c., and also tried several plans of employing these methods, such as proposed by L. S. Hardin, William Dripps, George E. Waring, and others.

Without going into tedious details, the result might be stated, as giving these conclusions:

First. That the simplest, and, perhaps, all things considered, the safest plan to set milk to raise cream, is in shallow pans, in a good stream of cool, living water. The flow of water is a splendid disinfectant or absorbent of smells and air impurities, such as unavoidably belong about large dairies. And hence, entire cleanliness is more easily secured in spring-houses with good strong springs. But the *advantages* of spring-houses may be easily over balanced, if the springs are not convenient or cool enough. A well built spring-house for shallow pan setting must have three times the capacity or size as a house or room, wherein the deep-setting plan is employed, and the shallow pans will cost twice as much as the deep ones, holding an eqal amount of milk.

Second. We demonstrated, to our entire satisfaction, that deep cans, in a low temperature, say 45° or 49°, would raise cream yielding butter, equal in amount, and of superior quality (if in very hot weather) with shallow pans in a higher temperature—60° or over.

Third. We also demonstrated that the greater the depth, or bulk of milk, the lower the required temperature; and that about twenty inches was the maximum heighth of can, and nine inches the maximum diameter. Perhaps less high and diameter would be better.

Fourth. We also found that in very low lemperatures, less time was required for the cream to raise. With pans at 60°, it took thirty-six hours. With twenty-inch pans, at 45° to 49°, it took twenty-four hours; and at still lower temperatures, from twelve to fifteen hours. Of course, the low temperature had to be secured with the aid of ice.

Fifth. We also proved, to our entire satisfaction, that it was no advantage to create sound milk, or to expose it to the atmosphere to carry off animal odors; but that equally good and long keeping butter could be made by sealing up the fresh milk, and keeping it at low temperatures. We hane tested various inventions for cooling milk, some using an air-medium, cooled with ice; some with water, and some with both air and water.

We think where ice is entirely depended on to cool milk, that it is more economical of ice, as well as more efficient, to cool air surrounding the cans than to cool water.

The displacement of the heated air around the can by the cooler air is more rapid and perfect than would be the same process of displacement in the water medium. Of course, when cooled air is used, the arrangements for preventing waste must be complete and perfect, as the loss from exposure is greater. We have never tried cooling milk-rooms, with underground channels, or sub-earth ducts, as they are sometimes called; but from our observation of them at other places, we judge them to be very inefficient and expensive. As a plan to secure a low temperature through a continuous hot spell, the use of these ducts neither look reasonable, nor are their results, so far, at all promising.

CONSOLIDATED CROP RETURNS FOR SEPTEMBER, OCTOBER, AND NOVEMBER, 1877.

FROM RETURNS OF OFFICIAL REPORTERS.

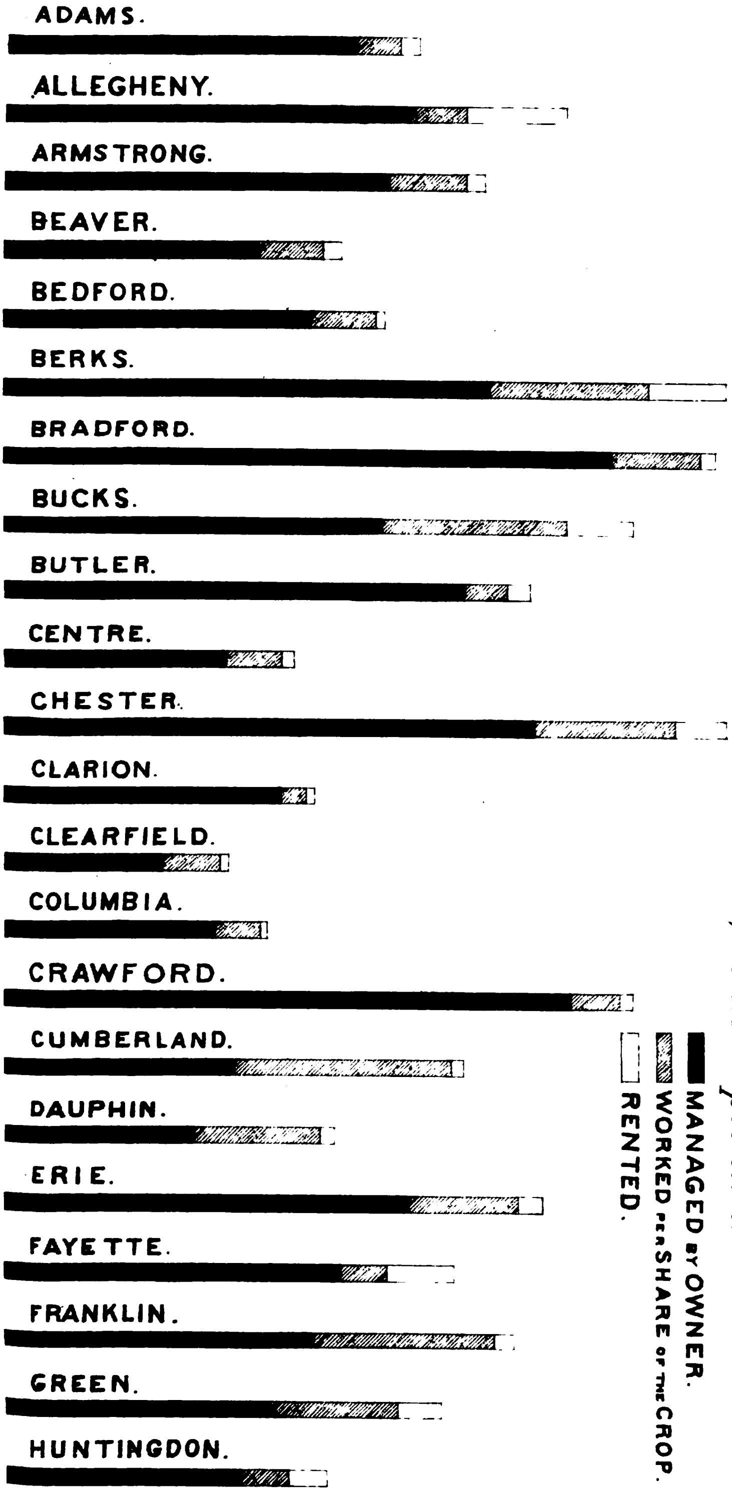
Per cent. of Yield of Crops Named.

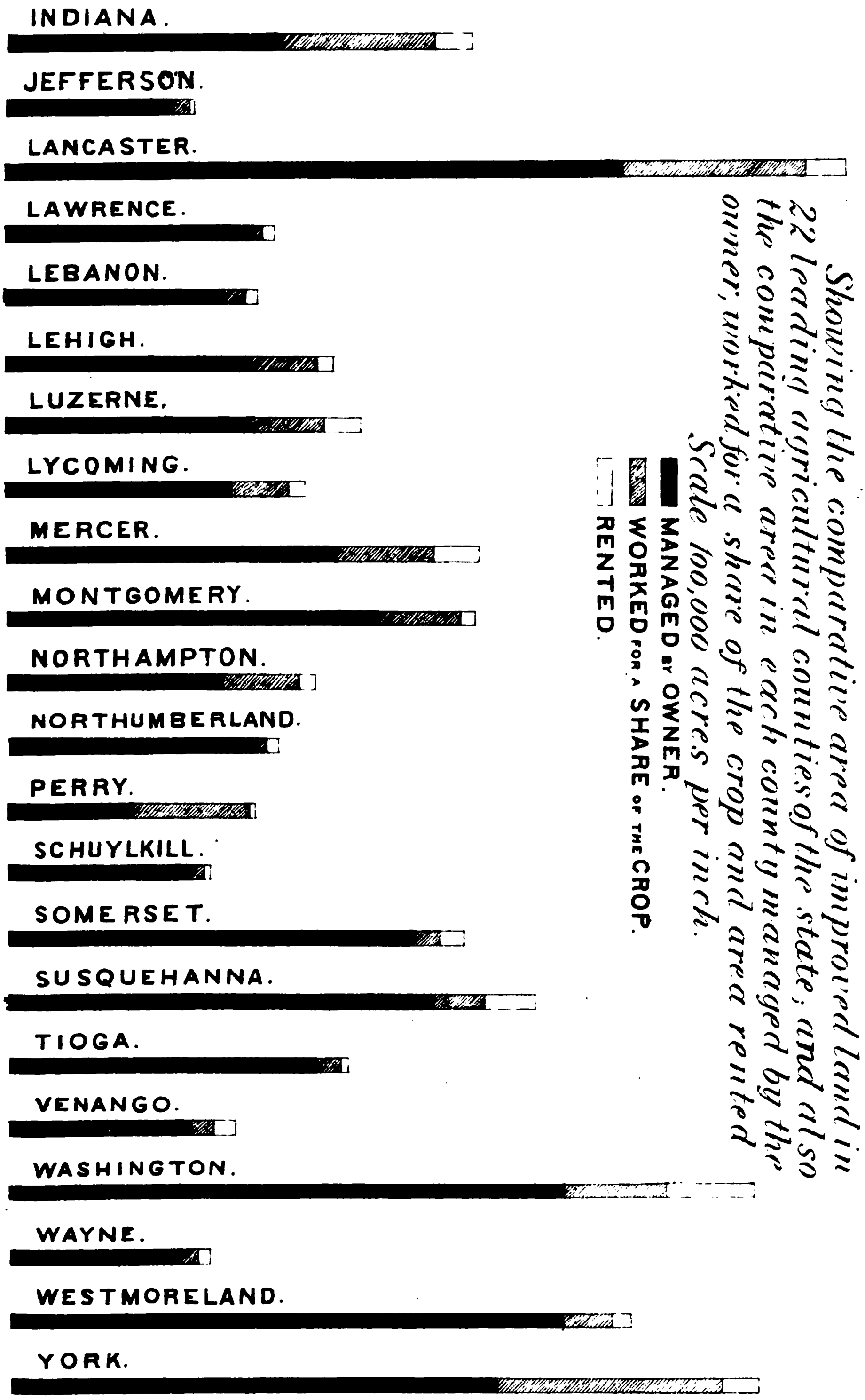
COUNTIES.	Wheat.	Rye.	Barley.	Oats.	Corn.	Potatoes.	Hay.	Straw.	Tobacco.	Garden Products.	Apples.	Peaches.	Pears.	Cherries.	Plums.	Grapes.
Adams,	105	85	74	70	70	51	130	120	75	95	35	25	48	87	78	78
Allegheny,	78	90	88	92	78	50	92	85	. . .	100	60	93	40	100	105	52
Armstrong,	68	90	. . .	90	61	52	85	85	. . .	90	50	50	55	75	54	41
Beaver,	95	85	80	105	85	65	110	98	. . .	92	75	75	70	92	75	75
Bedford,	100	100	90	85	55	52	85	102	. . .	85	50	39	40	31	18	45
Berks,	95	100	. . .	100	66	71	108	104	90	95	54	45	70	60	50	55
Blair,	106	90	95	105	58	58	108	105	. . .	85	35	25	45	40	30	58
Bradford,	110	100	100	95	85	48	120	108	100	88	80	92	70	72	50	75
Bucks,	105	100	. . .	102	90	80	115	108	. . .	100	50	75	100	54	45	95
Butler,	98	100	. . .	110	50	50	120	130	. .	108	45	50	90	100	100	75
Cambria,	98	100	75	95	55	45	104	108	. . .	95	30	40	30	50	60	80
Cameron,	100	95	100	100	100	60	95	100	100	100	25	26	30	28	40	60
Carbon,	93	95	. . .	90	82	75	115	105	. .	95	45	40	50	45	52	80
Centre,	105	105	90	98	40	40	130	120	. . .	98	35	45	70	61	56	65
Chester,	110	100	. . .	90	85	80	118	120	. . .	100	75	75	80	62	50	95
Clarion,	78	108	. . .	110	80	63	120	100	. . .	100	70	50	35	90	29	87
Clearfield,	115	102	. . .	110	57	58	120	120	100	100	25	28	. .	38	25	80
Clinton,	120	100	100	90	75	48	122	130	. . .	105	100	75	50	45	60	98
Columbia,	85	104	. . .	75	65	100	114	100	. .	92	70	70	65	75	30	40
Crawford,	135	97	. . .	87	98	54	105	115	. . .	95	75	75	70	40	35	45
Cumberland,	120	105	100	100	95	90	125	130	100	90	80	75	80	70	80	89
Dauphin,	121	108	100	100	95	75	120	125	100	110	42	70	75	60	80	55
Delaware,	108	80	. . .	108	70	85	125	115	. . .	108	54	52	65	75	45	100
Elk,	102	79	. . .	100	72	58	104	110	. . .	100	40	28	45	28	31	40
Erie,	120	100	95	95	89	80	115	115	. . .	100	80	90	76	58	40	91
Fayette,	120	100	. . .	85	98	52	85	105	. . .	100	55	60	75	. .	80	80
Forest,	90	100	. . .	98	85	65	89	100	. . .	95						
Franklin,	110	95	90	95	65	60	110	115	. . .	75	40	40	45	50	50	75
Fulton,	115	80	. . .	98	70	70	108	120	. . .	98	28	25	25	40	. .	78
Greene,	108	101	93	105	51	65	102	111	. . .	94	85	73	75	70	80	82
Huntingdon,	120	108	105	104	68	70	114	125	100	75	38	51	52	60	54	64
Indiana,	91	95	. .	106	42	70	100	98	. . .	98	40	45	46	75	51	82
Jefferson,	110	109	. . .	109	80	85	118	116	. . .	102	30	30	25	20	28	56
Juniata,	100	90	. . .	92	70	67	100	98	. . .	87	60	58	50	70	40	80
Lackawanna,	105	105	100	100	95	44	101	101	. . .	100	80	56	85	80	70	82
Lancaster,	120	102	100	82	85	72	120	120	100	101	100	80	60	82	70	100
Lawrence,	115	85	. . .	107	60	60	115	118	. . .	90	80	75	58	51	50	68
Lebanon,	110	110	. . .	98	68	80	128	125	. .	100	65	70	75	86	65	100
Lehigh,	70	104	. . .	95	50	50	125	92	. . .	92	28	27	75	35	25	70
Luzerne,	100	108	. .	92	89	58	91	108	. . .	90	60	32	51	42	46	48
Lycoming,	85	94	. .	95	70	58	102	95	. . .	85	54	52	68	40	42	58
McKean,	89	100	. . .	98	68	62	78	106	. . .	89						
Mercer,	111	80	. . .	108	75	70	100	106	. . .	100	70	94	70	75	58	68
Mifflin,	107	94	. . .	95	80	78	111	113	. . .	92	68	72	78	80	75	96
Monroe,	95	100	. . .	98	80	54	100	101	. . .	100	50	25	30	33	28	75
Montgomery,	109	100	. . .	109	80	85	122	104	. . .	100	42	85	60	45	80	102
Montour,	93	95	. . .	102	50	50	104	103	. . .	101	65	29	52	30	30	98
Northampton,	80	110	. . .	105	89	75	115	106	. . .	100	48	20	84	33	50	100
Northumberland,	101	100	. . .	108	90	80	105	110	. . .	105	60	78	80	60	70	78
Perry,	112	103	. . .	98	85	65	110	108	. . .	100	70	80	85	90	60	87
Philadelphia,	120	110	. . .	100	73	87	128	120	. . .	102	50	64	75	80	75	75
Pike,	102	100	. . .	100	90	65	89	104	. . .	92	50	25	38	25	20	45
Potter,	90	103	90	105	75	60	101	108	. . .	100	38	42	53	50	40	64
Schuylkill,	109	108	. . .	95	80	78	115	115	. . .	98	80	30	44	70	30	92
Snyder,	98	94	. . .	104	70	65	120	110	. . .	104	60	60	75	70	35	85
Somerset,	122	106	104	100	78	80	125	120	. .	100	48	60	65	50	25	65
Sullivan,	104	100	95	101	70	48	78	102	. . .	100	40	. .	38	45	25	90
Susquehanna,	105	105	. . .	110	95	58	90	111	. . .	90	80	75	52	70	70	85
Tioga,	100	100	100	95	80	47	98	100	. . .	92	85	38	78	48	60	89
Union,	98	104	. . .	110	52	58	126	120	. . .	108	60	30	78	80	. .	100
Venango,	106	100	100	111	85	60	115	120	. .	100	75	58	65	75	20	89
Warren,	90	100	102	100	90	68	90	95	. . .	92	30	28	39	42	40	87
Washington,	120	101	110	114	100	85	115	122	90	100	75	65	72	80	48	75
Wayne,	90	105	95	100	90	85	115	105	. . .	100	55	38	40	32	48	52
Westmoreland,	98	100	104	111	80	60	122	104	. . .	100	65	75	100	100	90	94
Wyoming,	105	103	. . .	95	80	75	100	104	. .	100	90	80	78	60	70	87
York,	115	89	. . .	111	80	75	115	124	. . .	100	85	85	92	50	40	89

PLATE

Showing the comparative area of improved land in 22 counties of the state; and also the comparative area in each county managed by the owner, worked for a share of the crop and the area rented.

Scale 100,000 acres per inch.





PLATE

Showing the comparative area of improved land in 22 leading agricultural counties of the state; and also the comparative area in each county manged by the owner, worked for a share of the crop and area rented.

Scale 100,000 acres per inch.

CONSOLIDATED CROP REPORTS FOR JUNE, JULY, AND AUGUST, 1878.

From Returns of Official Reporters.

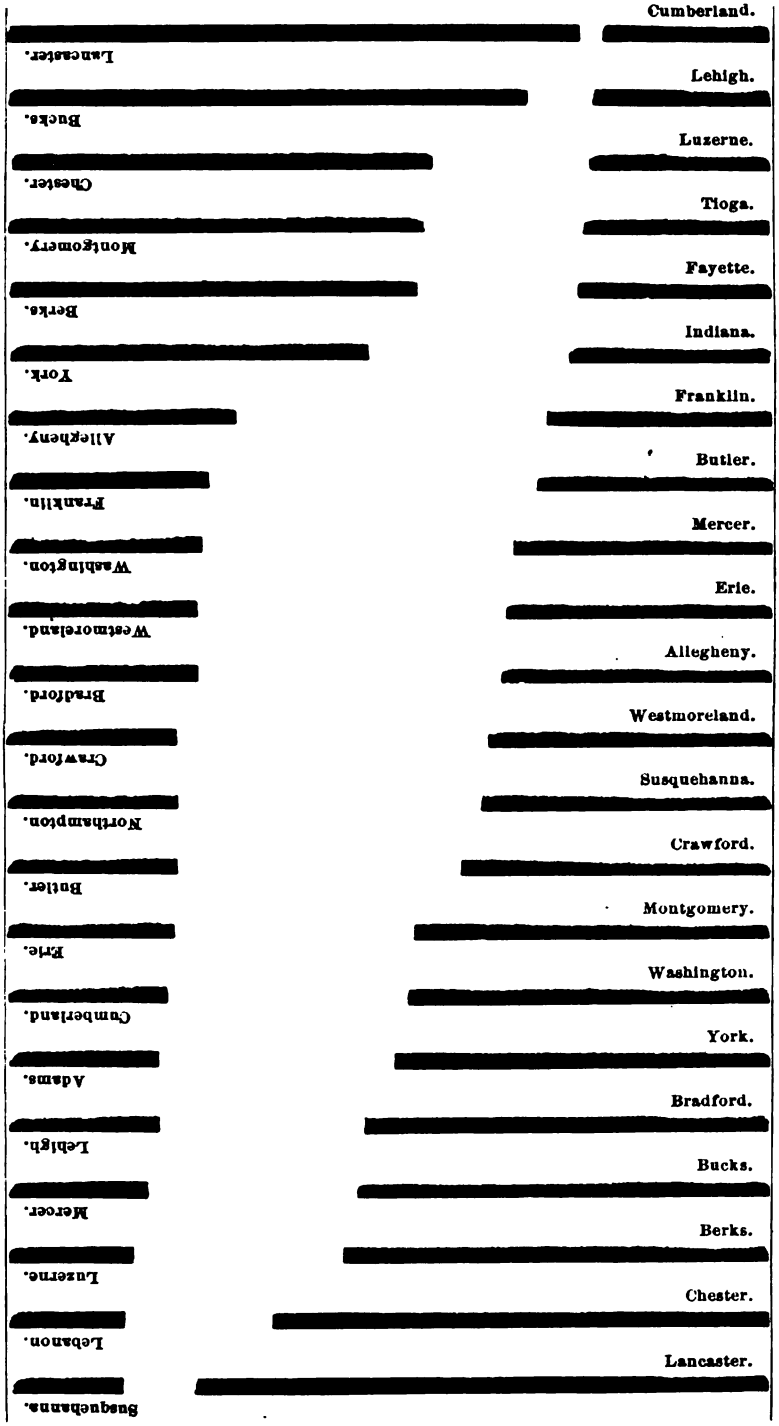
Per cent. of Yield of Crops named, as indicated by appearances.

Counties.	Wheat.	Rye.	Barley.	Oats.	Hay.	Straw.	Garden products.	Apples.	Peaches.	Pears.	Cherries.	Plums.	Grapes.	Berries.
Adams,	125	90	75	100	143	120	111	37	23	52	58	75	80	83
Allegheny,	75	88	85	105	80	83	100	53	94	45	100	120	50	102
Armstrong,	69	96	. . .	108	83	82	100	55	.56	63	80	57	40	90
Beaver,	93	82	90	120	107	100	102	87	85	. . .	102	100	100	100
Bedford,	102	100	90	95	83	108	85	51	38	30	25	15	24	37
Berks,	85	102	. . .	108	112	104	98	60	35	51	55	56	45	86
Blair,	100	95	102	110	98	110	90	43	24	42	31	28	40	90
Bradford,	110	100	90	101	122	110	96	86	101	66	72	54	75	86
Bucks,	100	105	. . .	122	120	110	107	56	75	100	54	66	101	106
Butler,	100	100	. . .	150	125	150	120	48	52	94	110	105	72	115
Cambria,	101	104	80	110	104	115	101	28	51	27	35	28	74	75
Cameron,	95	95	100	100	94	102	100	25	25	25	25	42	51	67
Carbon,	95	98	101	120	107	110	95	50	50	60	50	50	62	107
Centre,	130	110	115	125	140	140	115	35	72	70	62	58	56	94
Chester,	115	107	. . .	115	120	120	102	80	75	50	62	. . .	100	100
Clarion,	82	120	. . .	125	120	101	102	75	75	35	89	28	64	100
Clearfield,	120	104	. . .	100	98	110	100	24	27	. . .	30	. . .	40	89
Clinton,	142	104	110	120	125	130	110	80	55	50	72	34	50	100
Columbia,	85	104	. . .	110	115	102	87	50	75	50	75	30	35	95
Crawford,	143	95	. . .	101	105	110	98	64	62	70	35	30	32	103
Cumberland,	124	110	. . .	120	112	145	95	85	75	98	87	80	89	98
Dauphin,	140	120	. . .	115·	112	130	120	54	42	75	54	82	52	78
Delaware,	112	110	105	128	135	115	120	64	52	51	72	42	101	115
Elk,	110	78	. . .	115	102	110	100	42	38	41	24	30	27	95
Erie,	135	101	100	95	115	110	100	87	92	75	. . .	. . .	. . .	110
Fayette,	125	100	. . .	100	80	105	102	50	75	. . .	85	87	. .	100
Forest,	98	101	. . .	102	89	100	95	. . .	. . .	. . .	. . .	. .	75	102
Franklin,	115	90	90	95	110	115	75	40	40	50	50	60	50	75
Fulton,	125	75	. . .	100	110	140	95	28	25	44	30	14	24	87
Greene,	115	102	92	110	102	112	100	80	72	90	92	87	110	105
Huntingdon,	120	104	. . .	115	115	120	96	42	48	56	61	80	42	87
Indiana,	90	94	. .	115	100	95	100	35	35	50	72	51	40	90
Jefferson,	120	120	. . .	115	120	115	100	30	30	28	31	20	42	98
Juniata,	101	85	80	100	94	100	87	75	60	50	74	70	64	78
Lancaster,	122	105	. . .	115	122	122	100	100	102	80	64	72	101	115
Lawrence,	121	80	100	115	115	120	100	100	72	55	89	50	35	100
Lebanon,	120	120	. . .	100	130	125	100	51	70	75	89	60	95	110
Lehigh,	64	105	. . .	118	130	94	89	25	25	70	34	23	60	101
Luzerne,	105	115	. .	102	89	110	82	80	30	45	50	45	30	87
Lycoming,	84	91	. . .	100	102	92	84	60	50	40	51	41	38	75
McKean,	87	100	100	102	75	115	87	. . .	. . .	. . .	. . .	. . .	. . .	102
Mercer,	122	75	. . .	125	100	100	95	62	100	75	80	54	50	100
Mifflin,	112	90	. . .	100	112	115	89	65	75	68	80	75	90	78
Monroe,	85	101	. .	98	95	102	101	50	28	35	38	24	62	87
Montgomery,	109	100	. . .	122	123	102	100	38	37	55	45	98	104	96
Montour,	90	95	. . .	105	104	104	104	64	28	38	52	30	94	100
Northampton,	80	120	. . .	110	115	104	100	44	29	81	35	55	92	96
Northumberland,	102	100	. . .	110	105	110	110	60	75	80	72	64	100	100
Perry,	115	105	. . .	100	110	105	100	65	85	85	100	60	75	85
Philadelphia,	120	110	. . .	115	130	115	105	50	61	48	82	75	75	86
Pike,	102	100	. .	100	87	105	90	50	20	31	25	15	38	55
Potter,	95	105	90	110	100	110	100	35	50	42	50	40	. 55	102
Schuylkill,	112	110	. . .	100	115	115	95	38	40	72	75	30	92	78
Snyder,	98	92	. . .	115	120	110	105	70	61	72	85	36	80	92
Somerset,	130	110	105	100	105	125	100	40	60	50	50	28	52	80
Sullivan,	105	100	95	102	72	100	85	40	. . .	35	42	25	85	58
Susquehanna,	110	108	. . .	120	85	110	85	75	24	75	65	75	80	89
Tioga,	102	100	103	98	98	100	90	38	75	48	62	60	85	90
Union,	98	105	. . .	120	128	102	105	60	28	76	100	. . .	89	98
Venango,	110	100	100	115	115	120	100	75	58	50	70	25	78	90
Warren,	87	100	105	106	89	95	89	30	28	30	42	. . .	85	89
Washington,	122	101	110	125	115	115	100	75	65	80	82	48	70	98
Wayne,	91	105	85	100	115	105	102	52	38	29	30	48	36	100
Westmoreland,	97	100	107	120	122	125	100	60	75	100	100	100	38	102
Wyoming,	107	105	. . .	95	92	100	100	100	80	75	62	80	70	110
York,	125	85	. . .	115	120	125	102	85	85	90	50	50	75	95

CONSOLIDATED DAIRY AND STOCK REPORTS.

Showing average and consolidated estimates of the cost per pound of Summer and Winter Butter, and the cost of raising a Calf at one, two, and three years old, and its value as a Cow at three years old. From the returns of two hundred practical Dairymen.

COUNTIES.	SUMMER BUTTER.		WINTER BUTTER.		COST OF A HOME RAISED COW AT ONE, TWO, AND THREE YEARS OLD, AND VALUE AT THREE YEARS.			
	Cost, per pound.	Value, per pound.	Cost, per pound.	Value, per pound.	Cost, at one year old.	Cost, at two years old.	Cost, at three years old.	Value, at three years old.
Adams,	$0 15½	$0 19¾	$0 19¾	$0 22½	$12 50	$21 50	$40 30	$45 00
Armstrong,	15½	20	21½	26½	11 00	22 00	33 00	32 50
Allegheny,	18	28	28	25	10 00	20 00	35 00	46 00
Beaver,	11½	11¼	15	23	10 75	20 50	32 25	40 00
Bedford,	18½	20	17½	25	6 75	17 50	26 50	37 50
Berks,	12	18¼	16½	23¾	9 00	20 00	28 50	35 00
Blair,	15	16¼	28	29¼	9 00	18 50	33 00	37 50
Bradford,	15½	22	25	33½	11 50	21 00	33 33	36 50
Bucks,	24	24½	31½	34½	13 50	28 00	38 50	46 25
Cambria,	9	18	17	21	9 00	18 50	28 00	30 00
Cameron,	11	22½	21	28	8 75	16 75	32 25	25 00
Carbon,	10	21	23¼	35	9 25	19 75	32 50	43 00
Centre,	12½	14	19	22	11 50	20 00	30 00	34 00
Chester,	19½	28	24½	36	13 25	25 25	32 75	50 00
Clarion,	14	18	20	28	8 00	13 00	28 00	31 00
Clearfield,	20	20½	28	30	10 00	18 00	25 00	28 00
Crawford,	15	24	19	30	10 50	23 00	32 00	34 25
Cumberland,	17½	21½	23	25	8 00	14 50	23 50	35 00
Delaware,	22	34	26	35	12 75	30 50	52 50	56 00
Erie,	15	24	21	26	11 00	21 50	34 00	35 50
Franklin,	11	13½	15	20	12 50	26 25	33 50	33 50
Fulton,	14	12	18	18	9 80	18 60	28 60	30 00
Greene,	11	12½	12½	24	12 00	24 00	38 00	40 00
Huntingdon,	12	15	27	25	9 00	18 50	25 00	30 00
Juniata,	12	14	14	20	7 75	17 50	34 00	32 50
Lancaster,	18	20	28	34	12 50	21 50	30 50	40 00
Lebanon	9	16	16	23	10 00	28 00	33 33	35 00
Lehigh,	15	18	23	28	8 00	20 00	35 00	40 00
Mercer,	12	15	18	25	12 00	25 00	35 00	45 00
Montgomery,	18	20	28	23	14 00	30 00	35 00	45 00
Northampton,	12	20	15	25	6 50	18 50	23 50	35 00
Northumberland,	15	20	25	25	10 00	20 00	30 00	33 00
Potter,	18½	22	20	24	9 00	17 00	27 50	30 00
Sullivan,	17¾	23	20	25	10 00	20 00	27 00	32 00
Susquehanna,	17	24	22	30	9 50	18 00	27 00	35 00
Tioga,	18	25	23	30	9 50	18 00	30 00	33 00
Venango,	14	20	18	28	12 00	24 00	38 00	45 00
Warren,	16	22½	18	25	12 00	22 50	30 00	38 00
Washington,	15	18	22	26	9 00	19 50	30 00	34 00
Wayne,	12½	20	20	30	6 50	16 50	27 50	30 00
Westmoreland,	16	18	25	26	11 75	26 50	38 00	42 00
York,	10	18	13	22	8 50	17 50	28 50	33 00
Average,	$0 15½	$0 19½	$0 17	$0 25¾	$10 12½	$20 57	$34 85	$36 86



Comparative value of Farm Implements and Machinery in twenty-two counties—Scale $800,000 per inch.

Comparative value of Live Stock in twenty-two counties—Scale $2,000,000 per inch.

FARM WAGES, 1877.

Consolidated from the Returns of Three Hundred Official Reporters.

COUNTIES.	By the month, (whole year,) with board.	By the month, (summer months,) with board.	By the day, with board, (regular work.)	By the day, without board, (regular work.)	By the month, (whole year,) without b'rd.	By the month, (summer months,) without board.	Estimated cost of board per day.
Adams,	$10 00	$12 00	$0 60	$1 00	. . . . .	. . . . .	$0 45
Allegheny,	13 12	17 75	83	1 33	$30 00	$35 00	51
Armstrong.							
Beaver,	12 00	15 00	80	1 25	20 00	. . . . .	50
Bedford,	12 50	15 00	50	90	15 00	20 00	42
Berks,	10 00	13 00	75	1 05	18 00	20 00	50
Blair,	12 25	15 00	50	90	22 00	23 50	46
Bradford,	13 00	17 00	75	1 00	20 00	24 00	40
Bucks,	13 62	18 50	86	1 35	22 25	27 83	47
Butler,	10 50	17 00	72	1 00	20 00	25 50	42
Cambria,	12 00	17 50	60	90	23 00	33 00	37
Cameron.							
Carbon,	10 00	12 00	50	75	. . . . .	. . . . .	46
Centre,	10 50	12 00	68	95	18 75	20 00	39
Chester,	14 00	16 00	71	1 03	24 00	26 30	46
Clarion.							
Clearfield.							
Clinton,	12 20	15 00	75	1 00	. . . .	20 00	37
Columbia,	12 00	16 00	75	1 00	. . . . .	. . . . .	37
Crawford,	14 25	16 50	1 08	1 62	18 50	22 50	38
Cumberland,	11 00	15 50	65	95	21 04	23 00	40
Dauphin,	11 50	14 00	62	94	20 50	22 00	37
Delaware,	16 00	20 00	85	125	26 00	30 00	34
Elk.							
Erie,	10 00	14 00	50	87	20 00	23 00	37
Fayette,	10 00	15 00	75	1 00	. . . . .	. . . . .	35
Forest,	16 00	20 00	. . . . .	. . . . .	. . . . .	. . . . .	40
Franklin,	8 33	10 00	50	75	14 00	17 00	30
Fulton,	10 00	15 00	60	1 00	. . . . .	. . . . .	40
Greene,	11 25	17 50	75	1 00	19 00	24 00	35
Huntingdon,	11 50	13 00	62	87	21 00	24 00	25
Indiana,	12 00	16 00	1 00	1 25	18 00	22 00	40
Jefferson,	12 00	15 00	1 00	1 25	20 00	25 00	40
Juniata,	9 50	11 50	62	95	13 50	18 00	40
Lancaster,	14 33	17 50	83	1 15	24 00	27 53	65
Lawrence,	12 00	15 00	75	1 00	20 00	25 00	35
Lebanon,	11 00	15 00	75	1 00	20 00	25 00	37
Lehigh,	11 00	14 00	87	1 12	. . . . .	. . . . .	40
Luzerne,	13 00	17 00	75	1 00	24 00	30 00	33
Lycoming,	15 00	18 00	1 00	1 25	22 00	26 00	34
McKean,	16 00	20 00	1 00	1 25	25 00	30 00	37
Mercer,	12 00	15 00	87	1 25	22 50	30 00	48
Mifflin,	11 00	13 00	75	1 00	. . . . .	. . .	35
Monroe,	11 00	14 00	75	1 12	20 00	25 00	37
Montgomery,	13 66	18 00	87	1 25	23 50	30 00	43
Montour.							
Northampton,	11 00	15 00	75	1 00	. . . . .	. . . . .	35
Northumberland,	11 00	13 00	75	1 00	. . . . .	. . . . .	44
Perry,	12 00	16 00	75	1 00	20 00	25 00	34
Philadelphia,	15 00	18 00	1 20	1 50	40 00	50 00	55
Pike.							
Potter,	15 00	18 00	75	1 00	20 00	24 00	40
Schuylkill,	14 00	18 00	90	1 25	28 00	35 00	47
Snyder,	15 00	19 00	75	1 00	20 00	24 00	30
Somerset,	14 00	20 00	85	1 10	20 00	28 00	34
Sullivan,	18 00	21 00	87	1 20	22 00	24 00	40
Susquehanna,	13 00	18 00	1 00	1 25	26 00	30 00	48
Tioga,	15 00	20 00	87	1 12	26 00	30 00	36
Union,	13 00	17 00	75	1 00	18 00	24 00	35
Venango,	14 00	18 00	1 10	1 30	25 00	30 00	42
Warren,	15 00	18 00	1 00	1 25	20 00	26 00	40
Washington,	12 00	15 00	62	1 06	23 50	25 50	50
Wayne,	12 00	16 00	1 00	1 25	14 00	20 00	42
Westmoreland,	14 00	18 00	75	1 00	25 00	30 00	45
Wyoming.							
York,	11 50	15 50	72	1 17	20 00	25 00	45
Average,	$12 30	$15 10	$0 80	$1 15	$20 97	$26 07	$0 35

FARM WAGES, 1878.

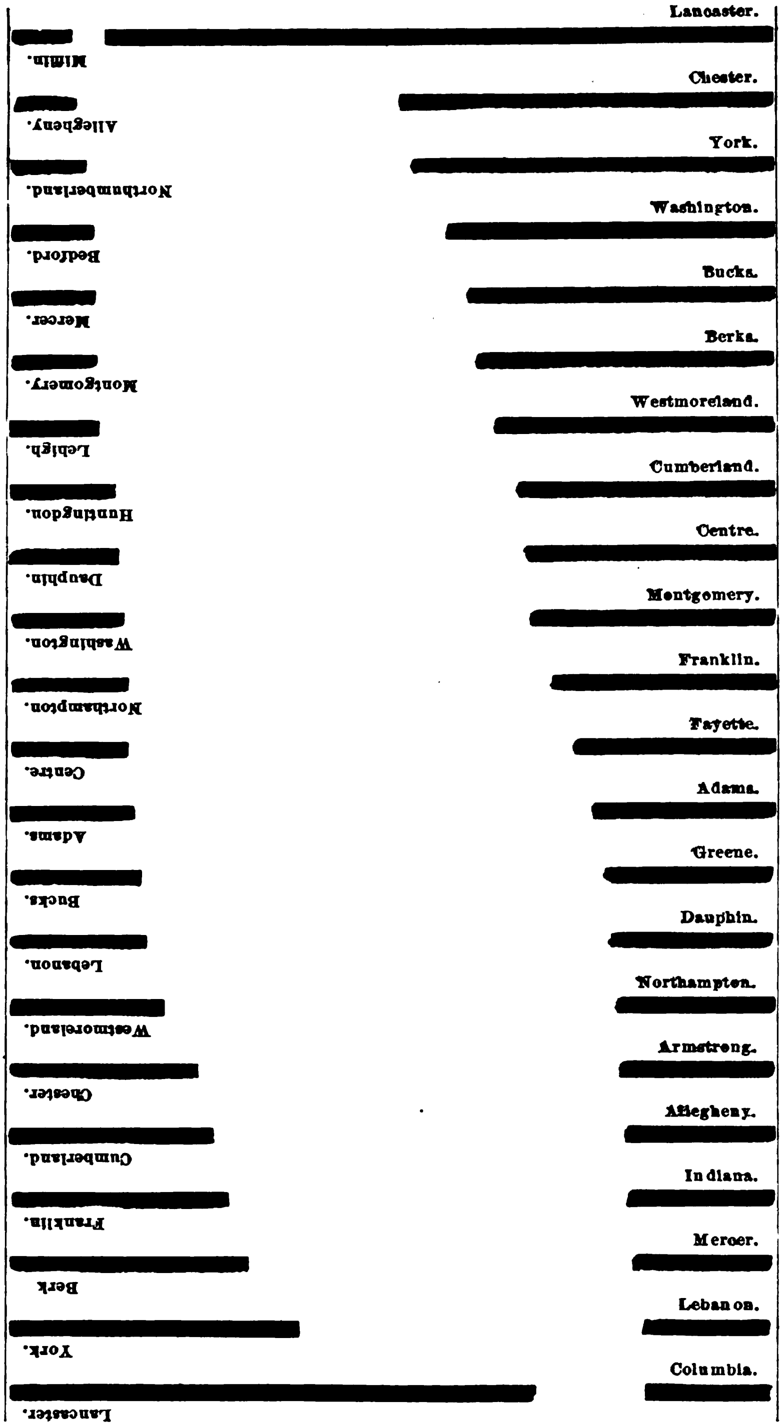
Consolidated from the July Returns of Three Hundred Official Reporters.

COUNTIES.	By the month, (whole year,) with board.	By the month, (summer months,) with board.	By the day, (with board,) regular work.	By the day, (without board,) regular work.	By the month, (whole year, (without board.	By the month, (summer months,) without board.	Harvest wages, with board.
Adams,	$10 00	$12 50	$0 60	$0 95	$19 50	$22 50	$1 25
Allegheny,	11 50	15 00	75	95	21 50	30 00	1 25
Armstrong,	12 50	15 00	75	95	20 00	25 00	1 00
Beaver,	10 75	14 50	75	1 00	17 50	22 00	1 00
Bedford,	10 00	13 25	60	85	13 00	15 50	1 25
Berks,	10 00	12 50	60	75	16 50	20 00	1 00
Blair.	10 00	13 00	55	87	19 00	22 00	1 00
Bradford,	11 75	14 50	65	90	17 50	22 50	1 00
Bucks,	12 50	15 00	75	1 15	20 00	23 50	1 37
Butler.	8 00	10 00	1 00	1 40	18 00	22 00	1 00
Cambria,	8 50	12 00	50	75	10 75	16 00	1 00
Cameron,	14 00	18 00	75	1 10	24 00	28 00	1 00
Carbon,	10 00	12 00	60	90	22 00	26 50	95
Centre,	10 50	12 50	62	85	16 50	20 00	1 10
Chester,	14 00	16 50	65	95	22 00	25 00	1 10
Clarion,	. . . . .	. . . . .	62	87	. . . . .	. . . . .	1 12
Clearfield,	12 00	15 00	75	95	18 00	20 50	1 25
Clinton,	12 75	15 00	62	87	18 00	20 75	1 00
Columbia,	10 00	13 50	60	87	18 00	20 00	1 00
Crawford,	12 75	15 50	75	1 10	25 00	30 00	1 10
Cumberland,	13 00	15 00	62	90	20 00	25 00	1 12
Dauphin,	12 00	15 00	60	75	18 00	20 00	1 00
Delaware,	12 75	15 00	75	1 00	18 50	21 50	1 25
Elk,	14 00	16 75	75	1 10	22 00	25 25	1 12
Erie,	13 50	15 75	75	1 05	19 50	23 50	1 12
Fayette,	10 00	12 50	75	1 00	. . . . .	. . . . .	1 06
Forest,	15 00	18 50	75	1 25	29 50	32 50	1 12
Franklin,	11 00	14 25	70	1 00	18 25	21 75	1 20
Fulton,	10 50	12 75	60	95	18 00	21 50	1 00
Greene,	11 75	14 25	75	1 00	17 50	20 00	1 00
Huntingdon,	11 50	14 25	62	85	14 50	18 00	1 25
Indiana,	11 00	12 75	62	95	17 25	20 00	1 12
Jefferson,	11 75	13 75	62	87	15 50	20 75	1 12
Juniata,	11 50	13 75	60	75	15 25	23 00	1 12
Lancaster,	12 25	15 50	70	95	15 60	20 00	1 20
Lawrence,	10 00	15 00	75	1 10	21 00	24 50	1 00
Lebanon,	8 00	11 50	65	88	13 50	16 75	1 00
Lehigh,	9 75	12 00	70	95	17 50	23 75	1 12
Luzerne,	12 50	15 00	65	1 00	21 50	25 50	1 00
Lycoming,	14 50	18 25	70	1 00	20 00	24 50	1 10
McKean,	15 00	19 00	1 00	1 30	24 00	27 50	1 12
Mercer,	9 75	16 00	75	1 10	13 50	20 00	1 10
Mifflin,	10 00	13 25	75	1 00	. . . . .	. . . . .	1 00
Monroe,	10 00	12 25	55	87	. . . . .	. . . . .	1 00
Montgomery,	12 50	15 50	75	1 12	20 00	24 00	1 12
Montour,	10 00	12 50	62	95	18 00	22 00	1 00
Northampton,	8 50	10 75	75	1 00	. . . . .	. . . . .	1 20
Northumberland,	10 00	12 50	62	87	15 00	18 75	1 00
Perry,	10 00	12 25	55	80	14 00	16 50	1 12
Philadelphia,	15 00	18 50	87	1 12	24 00	27 50	1 30
Pike,	11 00	13 00	60	1 00	18 00	21 50	1 00
Potter,	12 75	16 00	75	1 00	24 25	27 00	1 00
Schuylkill,	12 00	16 00	68	1 00	22 00	25 25	75
Snyder,	12 00	16 00	50	75	20 00	23 75	1 00
Somerset,	10 50	13 25	65	95	. . . . .	. . . . .	1 12
Sullivan,	10 00	13 00	60	87	19 00	23 50	1 00
Susquehanna,	10 50	13 75	75	1 00	20 00	23 75	1 00
Tioga,	12 50	15 25	85	1 15	20 00	25 50	1 00
Union,	12 25	14 75	62	85	18 50	21 25	1 00
Venango,	12 00	15 00	75	1 00	18 00	22 50	1 00
Warren,	10 00	14 00	75	1 00	13 75	20 00	1 25
Washington,	12 50	16 25	70	95	20 00	23 50	1 25
Wayne,	12 00	15 25	75	1 00	15 00	18 50	1 00
Westmoreland,	11 50	14 25	65	90	21 00	24 50	1 00
Wyoming,	12 00	14 75	75	1 00	22 50	26 00	1 00
York,	12 00	15 75	75	1 05	20 00	24 00	1 12
Average,	$11 24	$14 05	$0 75	$0 95	$18 41	$24 07	1.08

PRICES OF FARM PRODUCTS AND STOCK, OCTOBER, 1878.

From the Returns of Official Reporters of the Board, October, 1878.

COUNTIES.	Wheat—per bushel.	Rye—per bushel.	Oats—per bushel.	Corn—per bushel.	Potatoes—per bushel.	Hay—per ton.	Butter—per pound.	Horses—average value.	Mules—average value.	Cows—average value.
Adams,	$0 90	$0 55	$0 25	$0 50	$0 50	$6 00	$0 18	$62 00	$70 00	$25 00
Allegheny,	92	52	23	50	76	9 00	25	120 00	100 00	42 00
Armstrong,	95	50	20	40	50	7 00	16	90 00	85 00	28 00
Beaver,	92	50	25	45	70	6 00	20	75 00	65 00	35 00
Bedford,	85	70	35	60	65	5 50	20	70 00	72 00	25 00
Berks,	1 00	60	30	50	62	8 50	18	80 00	75 00	38 00
Blair,	85	50	25	55	75	8 00	17	80 00	85 00	28 00
Bradford,	1 00	50	24	45	55	5 00	18	75 00	80 00	25 00
Bucks,	1 00	55	26	50	65	9 00	26	100 00	100 00	42 00
Butler,	90	50	22	51	70	8 00	15	80 00	85 00	25 00
Cambria,	80	40	20	55	65	6 00	18	62 00	70 00	25 00
Cameron,	1 00	50	30	50	60	10 00	20	50 00	75 00	22 00
Carbon,	1 05	60	31	57	55	12 00	25	85 00	100 00	40 00
Centre,	87	50	28	56	75	8 00	18	75 00	85 00	28 00
Chester,	95	55	31	50	50	10 00	28	100 00	105 00	50 00
Clarion,	1 12	68	22	50	50	8 00	20	70 00	80 00	31 00
Clearfield,	1 05	75	32	50	75	8 00	22	85 00	87 00	24 00
Clinton,	90	55	25	60	70	9 50	20	80 00	83 00	28 00
Columbia,	95	48	26	52	68	9 00	17	95 00	100 00	26 00
Crawford,	95	50	23	48	60	6 50	18	80 00	80 00	28 00
Cumberland,	95	60	23	46	53	6 00	13	75 00	90 00	28 00
Dauphin,	98	55	28	60	65	8 00	18	75 00	80 00	30 00
Delaware,	98	55	32	54	70	11 00	31	100 00	105 00	51 00
Elk,	93	65	30	62	45	9 00	20	65 00	70 00	30 00
Erie,	95	50	30	46	51	6 00	18	75 00	80 00	23 00
Fayette,	92	50	22	51	43	6 00	15	75 00	75 00	30 00
Forest,	1 10	70	32	60	70	11 00	18	110 00	105 00	28 00
Franklin,	90	55	25	50	70	7 00	13	80 00	82 00	30 00
Fulton,	95	60	28	60	55	8 00	13	65 00	70 00	22 00
Greene,	93	55	20	50	43	7 00	17	60 00	70 00	35 00
Huntingdon,	85	43	25	50	60	6 00	19	85 00	90 00	28 00
Indiana,	91	41	21	46	35	6 00	17	75 00	78 00	26 00
Jefferson.										
Juniata,	90	60	25	50	52	7 00	16	75 00	75 00	25 00
Lackawanna,	1 05	58	28	52	70	10 00	19	85 00	90 00	30 00
Lancaster,	94	56	30	53	70	10 00	20	80 00	85 00	42 00
Lawrence,	1 00	60	26	48	65	6 00	18	100 00	95 00	35 00
Lebanon,	1 00	50	29	55	55	8 50	13	70 00	72 00	28 00
Lehigh,	1 00	58	31	51	65	9 00	18	85 00	80 00	32 00
Luzerne,	1 00	50	30	50	60	10 00	20	100 00	100 00	40 00
Lycoming,	98	60	29	50	68	9 00	19	90 00	85 00	32 00
McKean,	1 05	70	36	66	62	6 00	18	87 00	87 00	28 00
Mercer,	98	70	30	45	60	6 00	15	75 00	60 00	32 00
Mifflin,	89	58	25	51	60	7 00	15	80 00	85 00	26 00
Monroe,	1 05	54	31	52	46	9 00	17	85 00	88 00	26 00
Montgomery,	1 00	56	35	50	80	8 00	26	75 00	70 00	43 00
Montour,	95	40	25	50	50	8 00	20	75 00	80 00	36 00
Northampton,	1 00	50	29	51	63	10 00	21	95 00	90 00	41 00
Northumberland,	1 00	60	31	48	52	10 00	18	89 00	90 00	34 00
Perry,	93	50	23	55	46	7 50	13	95 00	92 00	24 00
Philadelphia,	1 05	53	25	55	55	10 00	25	125 00	125 00	50 00
Pike,	....	60	35	60	50	10 00	20	95 00	95 00	25 00
Potter,	1 00	70	28	68	50	7 00	16	80 00	80 00	20 00
Schuylkill,	1 00	65	32	56	80	12 00	20	88 00	87 00	35 00
Snyder,	92	47	22	50	40	9 00	16	74 00	65 00	25 00
Somerset,	1 00	55	26	55	44	6 00	15	85 00	85 00	25 00
Sullivan,	1 00	75	34	53	61	10 00	16	90 00	93 00	28 00
Susquehanna,	1 02	65	28	60	45	6 00	18	87 00	80 00	22 00
Tioga,	1 00	72	23	50	55	5 50	22	78 00	80 00	25 00
Union,	92	50	22	64	65	8 00	16	78 00	76 00	30 00
Venango,	95	65	22	55	55	7 00	20	75 00	78 00	26 00
Warren,	1 10	75	30	55	62	6 50	19	78 00	80 00	25 00
Washington,	85	55	28	48	50	6 00	18	90 00	92 00	26 00
Wayne,	1 10	70	35	68	65	8 00	16	85 00	80 00	28 00
Westmoreland,	89	49	21	50	55	6 00	20	95 00	100 00	33 00
Wyoming,	95	55	22	48	56	6 00	16	76 00	80 00	30 00
York,	90	46	25	55	70	7 50	16	85 00	85 00	30 00



Comparative Corn Production of Twenty-two counties—Scale 750,000 bushels per inch.

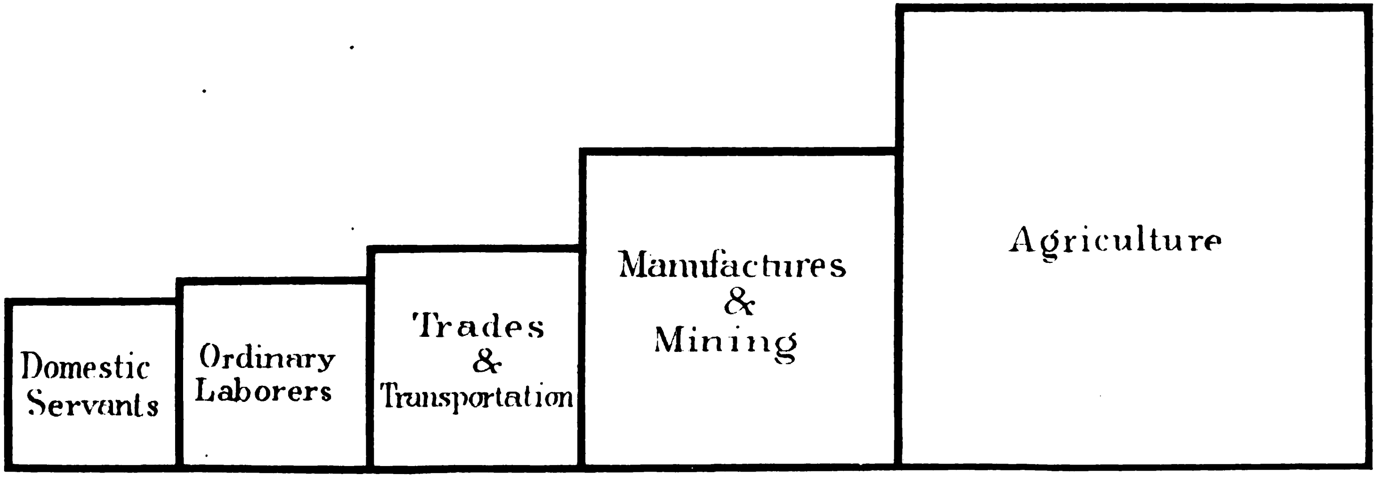
Comparative Corn Production of Twenty-two counties—Scale 800,000 bushels per inch.

ACREAGE OF THE LEADING CROPS COMPARED WITH LAST YEAR, AND WITH AVERAGE OF THE PAST TEN YEARS.

From the Returns of Three Hundred Official Reporters.

COUNTIES.	ACREAGE COMPARED WITH LAST YEAR.							ACREAGE COMPARED WITH AVERAGE OF TEN YEARS.						
	Wheat.	Rye.	Barley.	Oats.	Hay.	Corn.	Potatoes.	Wheat.	Rye.	Barley.	Oats.	Hay.	Corn.	Potatoes.
Adams,	100	87	. . .	90	105	100	95	90	85	. . .	92	105	100	85
Allegheny,	107	87	. . .	100	100	100	105	120	65	. . .	100	100	115	115
Armstrong,	102	110	. . .	113	100	103	107	88	110	. . .	112	90	100	100
Beaver,	106	95	100	110	105	102	110	115	90	95	110	90	110	105
Bedford,	105	100	30	65	85	95	85	100	100	. . .	90	100	100	90
Berks,	100	102	. . .	95	100	100	100	85	108	. . .	95	90	94	90
Blair,	120	110	100	100	100	110	90	115	100	120	100	120	130	125
Bradford,	115	120	125	90	100	95	115	111	110	95	112	115	105	115
Bucks,	100	103	. . .	95	100	97	85	100	95	. . .	100	100	100	105
Butler,	175	100	. .	100	140	100	100	125	100	. . .	125	150	150	200
Cambria,	110	110	100	115	105	90	80	120	120	80	125	125	120	100
Cameron,	125	108	. . .	85	115	115	90	175	120	. . .	115	150	120	130
Carbon,	125	145	100	100	120	100	120	130	120	. . .	115	87	100	100
Centre,	108	110	105	125	107	90	90	120	100	80	85	115	95	95
Chester,	100	100	. . .	102	100	105	101	108	110	50	110	105	105	85
Clarion,	101	105	. . .	125	105	107	100	109	115	. . .	125	110	115	125
Clearfield,	122	100	50	100	100	100	105	120	100	. . .	110	115	105	110
Clinton,	120	105	. .	140	150	95	110	125	112	110	130	125	100	100
Columbia,	95	120	. . .	100	100	100	110	90	150	. . .	100	100	100	90
Crawford,	104	100	. . .	100	100	100	90	115	100	. . .	100	115	110	110
Cumberland,	100	100	. . .	110	105	102	130	105	95	. . .	95	105	105	100
Dauphin,	85	110	. . .	100	100	100	115	85	115	. . .	100	100	100	140
Delaware,	102	100	. . .	95	105	100	85	103	104	. . .	85	110	103	100
Elk,	130	120	. . .	100	100	105	120	175	120	. . .	125	105	115	120
Erie,	125	100	. . .	98	102	85	65	120	100	. .	90	110	95	75
Fayette,	125	100	. . .	102	108	110	100	125	110	. .	110	115	106	115
Forest,	110	110	. . .	105	90	100	83	135	140	. . .	130	130	135	150
Franklin,	110	98	. . .	100	103	102	101	115	95	. . .	102	110	105	100
Fulton,	125	100	. . .	105	95	115	110	125	100	. . .	105	105	105	110
Greene,	130	100	. .	101	89	130	105	115	75	. .	85	110	115	120
Huntingdon,	120	105	. . .	105	110	100	100	130	110	. . .	110	125	115	125
Indiana,	95	85	. . .	100	105	95	90	90	85	. . .	93	115	120	100
Jefferson,	100	110	. . .	100	100	100	100	120	110	. . .	130	125	100	100
Juniata,	100	110	. . .	103	100	100	104	120	105	. . .	120	115	120	105
Lancaster,	100	110	. . .	103	102	95	98	110	110	. . .	115	115	103	105
Lawrence,	110	100	75	95	100	115	95	115	100	75	110	115	120	95
Lebanon,	100	105	. . .	100	100	100	110	112	115	. . .	110	105	110	115
Lehigh,	85	115	. . .	100	100	100	90	87	110	. . .	100	100	105	105
Luzerne,	115	120	. . .	100	93	95	90	115	105	. . .	100	102	95	100
Lycoming,	100	102	. . .	100	105	110	85	105	75	. . .	100	104	112	104
McKean,	125	100	100	100	100	101	75	150	100	100	120	115	110	95
Mercer,	110	100	. . .	110	100	80	80	125	75	. . .	110	100	100	100
Mifflin,	110	100	. . .	105	115	110	105	105	110	. . .	107	105	115	105
Monroe,	101	100	. . .	100	100	110	95	115	105	. . .	102	120	110	107
Montgomery,	100	95	. . .	95	105	100	115	100	105	. . .	90	105	100	110
Montour,	110	115	. . .	110	100	100	100	115	115	. . .	110	115	100	105
Northampton,	80	120	. . .	100	105	110	110	85	125	. . .	100	102	105	102
Northumberland,	80	115	. . .	100	95	100	102	87	130	. . .	102	98	101	104
Perry,	115	105	. . .	103	102	90	100	108	105	. . .	105	105	95	102
Philadelphia,	112	75	. . .	100	100	102	104	100	75	. . .	100	120	105	125
Pike,	110	115	.	110	105	110	95	125	125	. . .	125	105	100	125
Potter,	150	125	120	105	100	95	68	250	200	250	130	140	125	120
Schuylkill,	99	115	100	110	105	102	101	105	105	100	110	105	110	110
Snyder,	100	105	. . .	100	105	100	98	110	102	. .	108	105	110	105
Somerset,	100	95	100	100	105	115	100	160	85	110	110	120	150	125
Sullivan,	104	97	104	110	100	97	90	110	95	100	107	100	85	105
Susquehanna,	104	104	. . .	105	94	95	100	105	104	. . .	100	95	104	85
Tioga,	120	105	100	95	98	98	90	115	110	. . .	100	95	98	95
Union,	102	110	. . .	100	105	100	115	98	119	. . .	100	105	100	115
Venango,	130	100	100	105	120	105	110	125	75	. . .	125	120	125	125
Warren,	112	100	120	115	100	85	95	200	125	140	130	125	98	170
Washington,	110	100	87	115	89	105	105	110	100	100	130	90	115	120
Wayne,	100	110	90	105	110	90	85	110	115	100	100	110	110	105
Westmoreland,	105	85	100	95	102	100	92	122	95	110	100	110	100	100
Wyoming,	115	95	. . .	115	100	100	105	130	100	. . .	90	80	110	95
York,	110	90	. . .	100	125	102	100	115	100	. . .	110	120	110	95
Average,	110	107	95	103	98	111	100	117	106	104	107	110	110	109

Plate Showing the relative proportion of persons in the United States engaged in the following occupations Based on the census of 1870.



CONDITION OF LIVE STOCK, OCTOBER, 1878.

From the Returns of Three Hundred Official Reporters of the Board.

COUNTIES.	CONDITION OF FARM STOCK COMPARED WITH LAST YEAR.							CONDITION OF FARM STOCK COPARED WITH AVERAGE OF FIVE YEARS.						
	Horses.	Mules.	Oxen.	Cows.	Sheep.	Swine.	Fat cattle.	Horses.	Mules.	Oxen.	Cows.	Sheep.	Swine.	Fat cattle.
Adams,	100	100	95	100	100	100	90	100	100	95	100	100	100	95
Allegheny,	100	100	100	105	105	102	110	110	105	102	120	105	120	101
Armstrong,	100	100	90	102	105	101	87	102	101	89	105	102	101	89
Beaver,	100	85	90	101	95	90	90	92	95	85	100	100	95	90
Bedford,	100	100	110	110	100	95	105	100	100	105	105	112	95	102
Berks,	100	100	100	85	100	90	85	100	100	95	95	100	100	95
Blair,	95	95	100	90	85	95	100	100	95	98	90	95	95	100
Bradford,	100	100	105	107	110	110	111	110	100	105	105	110	105	105
Bucks,	105	100	. . .	102	100	100	100	105	105	. . .	107	105	100	100
Butler,	100	100	95	100	100	101	102	100	100	98	101	102	100	100
Cambria,	100	100	100	102	101	102	100	100	90	90	101	102	95	100
Cameron,	100	95	100	100	101	85	102	100	100	95	101	100	100	100
Carbon,	101	90	95	95	100	100	98	92	90	88	90	92	100	95
Centre,	100	100	. . .	95	95	95	98	102	102	. . .	103	100	100	98
Chester,	102	103	107	110	102	103	107	105	107	100	102	101	98	100
Clarion,	105	102	104	110	100	100	100	101	113	95	102	100	100	101
Clearfield,	100	100	100	102	105	98	100	100	104	100	103	100	100	102
Clinton,	100	100	90	95	98	100	101	100	100	100	98	98	101	100
Columbia,	101	101	100	102	102	102	100	100	100	100	100	100	100	100
Crawford,	102	103	100	103	101	104	101	110	102	100	111	106	104	101
Cumberland,	100	100	101	102	100	98	95	101	101	100	100	100	95	100
Dauphin,	100	100	100	101	100	101	100	101	101	100	102	101	104	100
Delaware,	100	100	101	102	104	100	95	100	100	100	103	105	98	101
Elk,	90	92	95	98	97	100	102	98	94	100	100	101	102	100
Erie,	100	100	102	95	101	102	100	101	102	100	104	103	100	101
Fayette,	100	100	101	102	98	102	85							
Forest,	98	80	98	105	102	104	89	100	100	105	105	106	100	102
Franklin,	100	100	92	100	95	100	100	105	100	100	102	101	95	101
Fulton,	100	100	102	103	104	100	100	103	105	106	102	101	104	102
Greene,	100	100	95	98	105	105	100	100	102	102	102	105	105	102
Huntingdon,	100	100	100	95	100	89	92	100	100	100	103	100	100	100
Indiana,	105	105	95	100	105	98	95	102	102	90	102	105	100	102
Jefferson,	100	100	100	100	98	101	104	100	101	102	104	100	100	100
Juniata,	100	100	95	98	95	100	100	100	100	98	95	94	98	100
Lackawanna,	102	101	101	100	104	105	100							
Lancaster,	110	100	100	110	105	105	102	105	105	100	105	110	110	105
Lawrence,	100	101	103	104	100	100	95	105	105	104	105	105	106	105
Lebanon,	100	100	95	98	100	100	101	105	105	102	105	104	101	102
Lehigh,	101	102	100	100	100	98	100	101	101	100	101	100	100	101
Luzerne,	100	100	100	100	100	100	100	102	101	101	100	102	100	103
Lycoming,	105	106	102	102	103	104	101	102	100	101	102	100	102	100
McKean,	100	100	110	110	105	90	90	101	101	110	110	110	105	95
Mercer,	110	106	108	100	110	105	102	105	102	105	104	104	105	102
Mifflin,	100	100	101	104	100	102	98	100	100	100	102	101	104	95
Monroe,	95	100	89	100	95	85	95	100	100	85	95	85	90	80
Montgomery,	102	102	101	105	101	100	105	110	110	105	105	110	100	100
Montour,	100	100	100	102	101	102	100	101	101	100	102	101	100	101
Northampton,	100	100	100	101	102	101	100	101	101	101	104	105	107	100
Northumberland,	100	100	100	100	100	100	100	101	101	101	104	103	102	100
Perry,	100	100	102	103	104	95	95	102	100	100	104	105	98	95
Philadelphia,	100	100	. . .	110	90	110	. .	98	101	. . .	115	100	100	
Pike,	100	100	100	105	. . .	102	100	100	100	105	110	. . .	100	100
Potter,	100	100	100	101	105	100	105	105	101	105	105	105	100	100
Schuylkill,	95	95	95	100	100	100	100	100	100	100	103	104	101	100
Snyder,	110	110	111	112	112	110	105	104	104	105	105	102	101	100
Somerset,	100	. . .	98	98	100	100	90	105	. . .	102	100	100	100	100
Sullivan,	104	100	102	100	100	100	104	104	100	101	102	104	101	100
Susquehanna,	102	102	102	104	104	100	100	101	101	102	103	100	100	100
Tioga,	105	105	106	105	105	100	105	110	110	112	110	110	100	100
Union,	98	100	100	105	102	100	100	98	100	102	104	102	100	100
Venango,	110	100	102	111	104	100	110	110	104	101	120	118	115	105
Warren,	100	100	100	104	102	101	100	102	102	102	104	102	103	100
Washington,	102	103	102	102	101	100	100	104	105	110	105	105	110	104
Wayne,	100	98	100	102	103	100	100	101	101	101	104	100	98	100
Westmoreland,	105	100	100	105	100	100	100	105	100	105	105	100	100	
Wyoming,	100	100	100	102	104	100	100	104	100	104	104	101	102	100
York,	109	100	90	111	101	111	100	111	111	100	120	100	120	100

ANALYSIS OF PREMIUMS OFFERED BY FROM OFFICIAL

NAME OF SOCIETY.	PRESIDENT.	SECRETARY.	ADDRESS OF SECRETARY.
1. Bedford County Agricultural Society,	William Keyser,	H. O. Kline,	Bedford,
2. Berks Co. Agricultural and Hort. Soc.,	Jacob G. Zerr,	H. B. Rhoads,	Reading,
3. (Berks co.) Keystone Agricultural Soc.	C. W. Miller,	W. B. Bieber,	Kurtztown,
4. (Butler co.) Connoquenessing Valley Agricultural Society,	G. B. Bastian,	J. D. Leytle,	Harmony,
5. Blair County Agricultural Society,	D. D. Morrell,	F. Jakel,	Hollidaysburg,
6. (Bradford co.) Troy Farmers' Club,	A. H. Thomas,	G. M. Card,	Sylvania,
7. Carbon County Industrial Society,	J. A. Hom,	W. M. Rapsher,	Lehighton,
8. Centre County Agricultural Society,	Adam Hoy,	C. Dale,	Bellefonte,
9. Chester County Agricultural Society,	Evans Rogers,	A. M. Eachus,	West Chester,
10. Chester Co. (Oxford) Agricultural Soc.,	Isaac Acker,	H. L. Brinton,	Oxford,
11. Clarion Co. Agricultural Association,	H. Wetter,	A. H. Alexander,	Clarion,
12. Columbia County Agricultural Society,	F. Evans,	M. W. Nuss,	Bloomsburg,
13. Crawford County Agricultural Society,	J. Bolard,	R. B. Meyers,	Conneautville,
14. (Crawford co.) French Creek Valley Agricultural Society,	R. Patton,	W. A. Logan,	Meadville,
15. (Crawford co.) Oil Creek Valley Agricultural Society,	J. Bramhall,	A. B. Finson,	Meadville,
16. Clearfield County Agricultural Society,	N. Rishel,	H. Hoover,	Clearfield,
17. Franklin County Agricultural Society,	E. Culbertson,	C. Gilbert,	Chambersburg,
18. (Greene co.) Waynesburg Fair Asso.,	W. T. Lantz,	A. L. Meyers,	Waynesburg,
19. (Greene co.) Rich Hill Fair Asso.,	George Loar,	J. T. Goodwin,	Wind Ridge,
20. Luzerne County Agricultural Society,	J. B. Smith,	A. S. Davenport,	Kingston,
21. (Lawrence co.) Harlansburg Agr. Soc.,	J. Humphry,	W. H. Shaffer,	Harlansburg,
22. Lycoming County Agricultural Society,	S. N. Williams,	J. J. Reardon,	Williamsport,
23. Mercer County Agricultural Society,	G. W. Porter,	L. Bonesteel,	Stoneboro',
24. (Mercer co.) West Pennsylvania Agricultural Society,	S. S. Donaldson,	W. J. McKean,	Mercer,
25. Montgomery Co. Agricultural Society,	N. Newberry, M. D.,	Joseph Rex,	Upper Dublin,
26. Northampton Co. Agricultural Society,	P. Kleppinger,	E. T. Grunewald,	Nazareth,
27. (Snyder co.) Union Agricultural Asso.,	D. S. Boyer,	M. Wetzel,	Selinsgrove,
28. Susquehanna Co. Agricultural Society,	A. Lathrop,	D. T. Brewster,	Montrose,
29. Washington Co. Agricultural Society,	J. H. Ewing,	J. F. Gabby,	Washington,
30. (Washington co.) Union Agr. Asso.,	W. B. Moorehead,	J. P. Wood,	Burgettstown,
31. (Warren co.) Union Agricultural Soc.,	Emry Davis,	D. B. Jagger,	Sugar Grove,
32. Westmoreland Co. Agricultural Soc.,	T. Donohoe,	J. G. Francis,	Greensburg,
3. York County Agricultural Society,	W. S. Roland,	A. H. Glatz,	York,

COUNTY AGRICULTURAL SOCIETIES.

SOURCES.

Awarded for horses.	Awarded for speed.	Awarded for cattle.	Awarded for sheep.	Awarded for swine.	Awarded for poultry.	Awarded for farm crops.	Awarded for farm implements.	Awarded for household products.	Awarded for floral display.	Miscellaneous awards.	Number of fairs held.	Date of exhibition, 1878.†	Single admission.	Season ticket.	Number of managers.	When incorporated.	Number of shares of stock.	Par value of stock.	Acres enclosed.	
$175	$42	$42	$13	$13	$17	$125	$40	$68	$10	$175	5	Oct. 1-4	35	$2 50	9	1875	240	$20	14	1
225	. . .	686	38	142	139	300	D*	120	136	D*	24	Oct. 1-4	25	. . .	8	1852	. . .	. .	30	2
75	625	47	12	11	43	70	60	184	. .	60	9	Sept. 17-20	25	. . .	13	1851	. . .	. .	. .	3
245	700	280	105	113	45	148	25	285	30	84	4	Sept. 10-13	50	2 00	10	1870	. . .	. .	. .	4
191	. . .	275	75	64	34	180	75	164	24	225	14	Oct. 1-4	25	. . .	7	1873	. . .	. .	30	5
90	. . .	125	40	15	25	65	D*	25	5	40	4	Sept. 18-20	25	. . .	15	. . .	. . .	. .	.	6
41	220	56	3	10	45	61	30	40	13	40	4	Oct. 8-11	25	1 00	. .	1875	500	20	20	7
95	58	68	12	67	30	115	D*	210	20	50	27	Oct. 9-11	25	. . .	6	1852	. . .	. .	20	8
158	1,500	685	114	415	100	165	62	600	300	50	. .	Sept. 19-21	50	1 00	15	1853	1,256	10	21	9
80	400	341	66	22	61	120	D*	145	66	. . .	. .	Sept. 25-27	25	1 00	12	1870	900	10	22	10
186	300	165	18	48	14	62	D*	86	6	D*	. .	Sept. 24-26	50	1 00	7	. . .	. . .	. .	. .	11
90	490	100	17	29	20	100	D*	49	. .	50	23	Oct. 9-12	25	. . .	11	1866	. . .	. .	10	12
357	46	475	108	64	18	66	30	265	25	250	26	Oct. 2-4	20	. . .	13	1852	. . .	. .	15	13
475	250	730	142	50	37	100	50	34	10	145	2	Sept. 17-19	25	. . .	14	1877	1,400	200	22	14
300	46	375	88	56	200	83	62	236	32	155	4	Sept. 17-19	25	. . .	7	1875	. . .	. .	21	15
36	160	43	8	10	4	60	32	50	. .	100	12	Oct. 15-18	25	1 00	5	1852	. . .	. .	20	16
283	1,060	300	104	80	30	100	75	132	25	75	. .	Oct. 8-11	25	1 00	9	1868	55	100	17	17
240	505	202	154	24	12	14	33	63	8	25	11	Sept. 24-26	50	75	12	1852	. . .	. .	10	18
190	250	43	. .	15	. .	18	12	100	10	85	13	Sept. 19-20	25	1 00	6	1866	300	5	6	19
78	210	175	27	27	14	51	74	86	25	D*	. .	Oct. 1-3	25	1 00	5	1873	. . .	50	40	20
175	245	145	55	112	18	50	87	87	32	50	7	Sept. 17-19	25	. . .	16	1870	. . .	. .	18	21
149	425	171	75	11	73	150	D*	218	35	75	18	Sept. 17-20	25	1 00	12	1855	. . .	. .	20	22
325	262	550	75	96	90	45	50	70	25	175	11	Oct. 8-10	25	. . .	7	1868	393	10	35	23
310	330	310	165	175	. .	70	90	183	20	130	8	Sept. 9-12	25	. . .	7	1871	900	10	40	24
95	4,750	408	110	85	100	210	20	552	272	125	30	Sept. 23-28	50	1 00	7	1870	3,259	5	34	25
124	234	124	12	23	22	75	50	164	25	130	26	Oct. 1-4	. .	. . .	. .	1858	825	10	10	26
40	180	19	8	11	50	33	D*	40	5	D*	6	Oct. 10-12	25	1 00	16	1871	510	. .	15	27
68	. . .	250	41	19	19	52	14	61	3	52	32	Sept. 25-26	25	1 00	5	1864	. .	. .	20	28
116	136	175	128	28	40	41	69	125	18	29	. .	Oct. 8-10	25	. . .	19	1824	125	20	8	29
360	225	240	206	105	66	47	45	212	45	50	23	Oct. 1-3	25	1 00	25	1855	. . .	. .	17	30
250	. . .	432	100	98	46	188	100	85	15	70	. .	Sept. 17-19	25	1 00	33	1873	. . .	. .	.	31
323	300	236	81	89	48	75	90	150	21	75	7	Sept. 24-27	25	1 00	13	1872	550	25	42	32
375	550	715	60	105	92	130	280	300	35	225	21	Oct. 1-4	25	1 00	11	1852	. . .	. .	14	33

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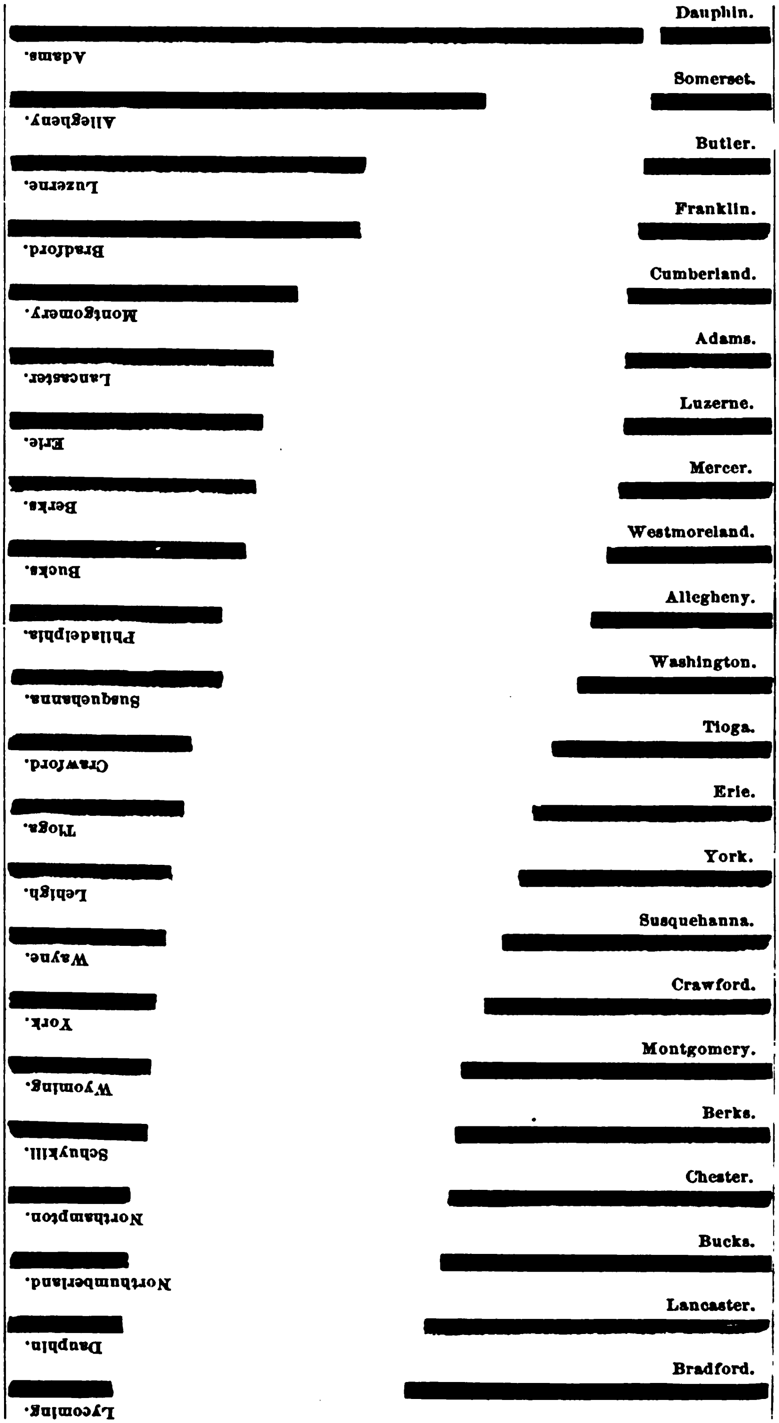
* D—Diploma.

† For date of county fairs throughout the State, see quarterly report for June, July, and August, page 46.

Where no return of the number of shares and par value of stock is made, it is understood that the society does not issue stock.



Comparative production of Potatoes in twenty-two counties—Scale 300,000 bushels per inch.

Comparative Hay product of twenty-two counties—70,000 tons per inch.

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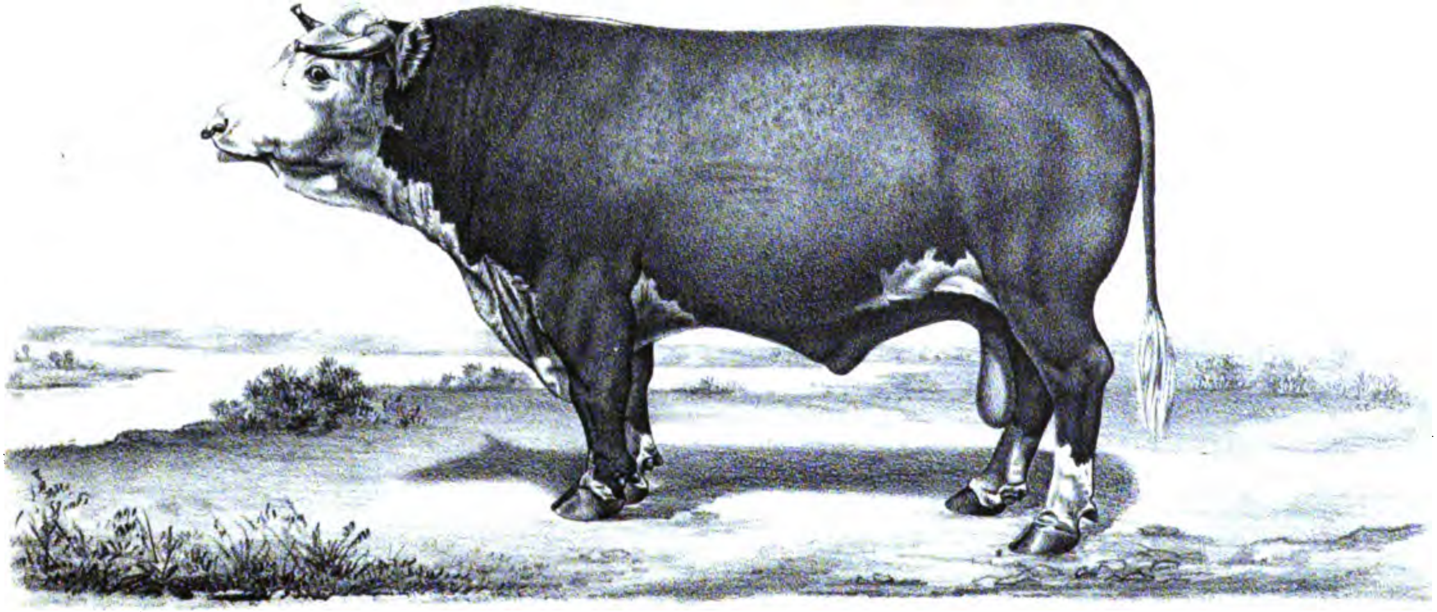


Prize Hereford Bull,

"COMPTON LAD"

Photo. from Life by Hovey, Phil^{a}.

REPORT

OF THE

PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

CONSTITUTION.

THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY was created a "body corporate" by the Legislature, on the 29th day of March, 1851. The act at large can be found in the statutes for 1851, and in previous volumes of the transactions of this society. The society sprung from a meeting held at Harrisburg, on the 21st of January, 1851, in which all the counties of the State were represented. On the 22d, the meeting had taken the form of a society, electing its first president and officers. On the 20th of January, 1852, it held its first annual meeting at Harrisburg, where, in the previous September, its first exhibition had been held, with a good degree of encouragement. Exhibitions have since been held at Lancaster, Pittsburgh, Philadelphia, Harrisburg, Wyoming, Norristown, Williamsport, Easton, Scranton, and Erie, with varying success, but always doing something toward developing the agricultural resources of the State.

The concerns of the society are intrusted to an executive committee, consisting of a president, twenty-seven vice presidents, one from each of the congressional districts into which the State is divided, five additional members, all the ex-presidents, a corresponding and recording secretary, a treasurer, a chemist and geologist, and a librarian, in all, as at present, constituted, a committee of forty-seven.

The constitution has been frequently, but not substantially, amended since its original adoption, in 1852, and now stands as it is given herewith. A list of life members is embodied in this issue. It has been impossible to preserve a necrological register, and, therefore, lapses by death are not noted. The list comprises the names of life members previously to the 1st January, 1878; a total of eight hundred and ten names, representing all parts of the State.

CONSTITUTION OF THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

The name of the Society shall be the PENNSYLVANIA STATE AGRICULTURAL SOCIETY. The objects of this society are to foster and improve agriculture, horticulture, and the domestic and household arts.

Who are Members.

SECTION 1. The Society shall consist of all such persons as shall pay to the Treasurer not less than two dollars, and annually, thereafter, not less than two dollars; and, also, of honorary and corresponding members; the names of the members to be recorded by the secretary.

The officers of county agricultural societies in this State, or delegations therefrom, shall be members *ex officio* of this society.

The payment of twenty dollars shall constitute life membership, and exempt the members so contributing from all annual payments.

Officers.

SECTION 2. The officers of this society shall be a president, a vice president from each congressional district, three fourths of whom shall be practical agriculturists or horticulturists, a treasurer, a corresponding secretary, a recording secretary, a librarian, an agricultural chemist and geologist, and such assistants as the society may find essential to the transaction of its business; an executive committee, consisting of the above-named officers, five additional members, with the ex-presidents of the society.

Of the President.

SECTION 3. The president shall have a general superintendence of all the affairs of the society. In case of the death, illness, or inability of the president to perform the duties of his office, the executive committee shall select a vice president to act in his stead, who shall have the same power and perform the same duties as the president, until the next annual meeting.

Of the Vice Presidents.

It shall be the duty of the vice president to take charge of the affairs of the association in their several districts; to advance all its objects; to call upon farmers to report as to the condition of agriculture in their neighborhood; to ask for information as to the modes of cultivation adopted by different farmers; and as far as in their power to make known the resources of their districts, the nature of its soil, its geological character, and all such matter as may interest farmers in every part of the State.

Treasurer.

The treasurer shall keep an account of all moneys paid into his hands, and shall pay bills when audited and approved by the executive committee, each order for payment must be signed by the president or chairman of the executive committee.

Corresponding Secretary.

The duty of this officer shall be to invite a correspondence with all persons interested in agriculture, whether in the State of Pennsylvania or elsewhere, but especially with our consuls in foreign countries, that new seeds, vegetables, or live stock may be introduced, and their fitness for cultivation and propagation in our climate be tested. At each stated meeting of the society, he shall read his correspondence, which shall, either the whole, or such parts as may be selected by the society, form a portion of the transactions. He shall also correspond with the president or other officers of each State society in the United States, at least twice in the year, for purposes of combined and mutual action, and to be informed of the result and progress of each other's efforts; also, to invite mechanics to forward models or implements for examination and trial.

Recording Secretary.

The recording secretary shall keep the minutes of the society and of the executive committee. At the close of each year he shall prepare for publication such parts of the minutes and transactions of the society as may be designated.

Librarian,

The librarian shall take charge of all books, pamphlets, &c., belonging to the society, and shall act as curator to preserve seeds, implements, or whatever property the society may possess.

Executive Committee and Quorum.

The executive committee shall transact the business of the society generally, and shall appoint, annually, at their first quarterly meeting, a recording secretary and treasurer, fix their salaries, and require security from the treasurer, if they deem it necessary; shall superintend and direct the publicaton of such of the reports and transactions as they may deem proper, and shall designate the time aud places for annual exhibitions, regulate the expenditures, examine all accounts, and keep such general charge of the affairs of the society as may best promote its interests.

They shall select their own chairman, and meet quarterly, and at any other time when convened by the president; five members shall form a quorum.

They shall call special meetings of the society when necessary.

Annual meeting of the Society and Quorum.

SECTION 4. The Society shall meet, annually, on the third Wednesday of January, at Harrisburg, when all the officers of the society, not otherwise appointed, shall be elected by ballot for the ensuing year, and until another election. They shall also hold a general meeting at the time of the annual exhibition, and special meetings whenever convoked by the executive committee.

Fifteen members shall form a quorum for the transaction of business, but no member in arrears shall be entitled to the privileges of the Society.

Qualifications of Voters.

SECTION 5. No annual member, hereafter, shall be entitled to vote for the election of officers of the Pennsylvania State Agricultural Society, unless he shall have been a member at the previous State fair, and in default of a State fair, then three months previous membership shall be necessary.

SECTION 6. No one shall be eligible to office hereafter who has not obtained a right to vote under section five.

Alteration.

SECTION 7. This constitution may be altered or amended at the annual meetings in January, by a vote of two thirds of the members in attendance.

LIFE MEMBERS.

Austin, John B., Philadelphia.
Alibone, Thomas, Philadelphia.
Allen, Josiah J., Philadelphia.
Anspach, J., Jr., Philadelphia.
Armstrong, James, Williamsport.
Allen, Robert P., Williamsport.
Andrus, D. S. Williamsport.
Allen, Charles, Williamsport.
Armstrong, William H., Williamsport.
Allen, John H., Montourstown.
Ayres, J. J., Williamsport.
Andrews, E., Williamsport.
Allen, William H., Agricultural College.
Armstrong, W. H., Easton.
Ashbridge, E. B., Willistown Inn P. O.
Allen, John E., Middletown.
Alricks, William K., Harrisburg.
Allen, John F., Harrisburg.
Anderson, James, Hogestown.
Bucher, G. H., Hogestown, Cumb. co.
Biddle, Craig, Philadelphia.
Boal, George, Boalsburg.
Bryson, Robert, Carlisle.
Baldwin, M. W., Philadelphia.
Brock, William Penn, Philadelphia.
Biddle, Alexander, Philadelphia.
Brown, George H., Philadelphia.
Bolden, George, Philadelphia.
Bard, Edwin Milford, Philadelphia.
Baxter, Isaac B., Philadelphia.
Burnside, James, Bellefonte.
Benson, Alexander, Philadelphia.
Bonson, G. S., Philadelphia.
Bradford, Vincent L., Philadelphia.
Brown, John A., Philadelphia.
Billings, James B., Philadelphia.
Brown, David S., Philadelphia.
Baker, Elias, Altoona.
Brautigam, Daniel, Northumberland,
Brown, Jacob B., Columbia.
Bell, Samuel, Reading.
Bell, William, Mifflin.
Bennett, James, Pittsburgh.
Beck, John B., Williamsport.
Bowman, Samuel, Wilkes-Barre.
Breeze, N. W., Wyoming.
Barto, Tobias, Reading.
Bercaw, Abraham, Easton.
Berkenbine, Samuel A., Northumberland.
Blair, Horace H., Williamsport.
Beard, Henry, Williamsport.
Beck, Samuel M., Williamsport.
Brown, James V., Williamsport.
Brown, Jacob, Newberry.
Berry John J., Williamsport.
Bush, D. G., Bellefonte.
Butt, Charles H., Williamsport.
Bender, George H., Easton.
Blight, George, Germantown.
Boyd, T. S., Easton.
Brawdy, George, Sharpsburg.
Bergner, George, Harrisburg.
Bissell, William S., Pittsburgh.
Bittenbender, Stephen, Shamokin.
Brown, G. W., M. D., Port Carbon.
Boyd, S. T., Easton.
Buehler, William, Harrisburg.
Boas, C. A., Harrisburg.
Bates, Abram, Harrisburg.
Bigler, Samuel S., Harrisburg.
Bomberger, Jacob C., Harrisburg.
Boyer, W. W., Harrisburg.
Briggs, John H., Harrisburg.
Boas, D. D., Harrisburg.
Bird, Joseph, Northumberland.
Buehler, Charles, Harrisburg.
Barr, W., Dr., Harrisburg.
Baily, Charles L., Pottstown.
Brown, James C., New Greenville.
Bound, David T., Kingston.
Bronson, D. H., Coatesville.
Baldwin, W. A., Williamsport.
Brown, ——, Titusville.
Cameron, Simon, Middletown.
Curwin, John, Harrisburg.
Chambers, Andrew R., Philadelphia.
Christian, S. J., Philadelphia.
Campbell, Hugh, Philadelphia.
Campbell, James R., Philadelphia.
Cadwallader, George, Philadelphia.
Colkit, C., Philadelphia.
Craig, Hugh, Philadelphia.
Carpenter, George W., Jr., Germantown.
Campbell, Thompson, San Francisco, Cal.
Cassidy, Joseph A., Philadelphia.
Clark, Edward S., Philadelphia.
Carmalt, S., Friendsville, Susquehanna co.
Cresson, John C., Philadelphia.
Carlisle, Robert M., Philadelphia.
Cornell, Adrian, Newton, Bucks county.
Campbell, William S., Philadelphia.
Cowden, J. B., Northumberland.
Chess, Moses, Temperanceville.
Calder, William, Harrisburg.
Conyngham, John N., Wilkes-Barre.
Carson, George N., Norristown.
Cake, Joseph W., Northumberland.
Calder, James, Rev., Harrisburg.
Clymer, Heister, Reading.
Conner, Joseph P., Fowlersburg.
Crans, Samuel M., Williamsport.
Campbell, John R., Williamsport.
Clark, James, Williamsport.
Clay, M. L., Williamsport.
Coleman, Fletcher, Williamsport.
Canfield, Ezra, Williamsport.
Campbell, E. B., Jersey Shore.
Cummings, R. D., Bellefonte.
Claydon, William, Pine Grove.
Cramer, Jacob, Uniontown.
Carter, William N., Jersey Shore.
Coryell, John B., Williamsport.
Crawford, A. S., Williamsport.
Colton, Henry, Williamsport.

Coder, N. B., Williamport.
Capron, E. W., Williamsport.
Calvin, Otts, P., N. Y. City, 234 Broadway.
Carpenter, E. P., Pittsburgh.
Cummings, A. B., Philadelphia.
Charles, J. S., Pittsburgh.
Cluly, William, Pittsburgh.
Coburn, J. P., Aaronsburg, Centre co.
Crawford, M. H., Philadelphia.
Child, S. S., Harrisburg.
Commings, Charles, Harrisburg.
Colestock, Jacob M., Harrisburg.
Colestock, Samuel H. Harrisburg.
Cassell, Jacob, Harrisburg.
Crisswell, J. Vance, Harrisburg.
Coover, John B., Mechanicsburg.
Cameron, J. D., Harrisburg.
Chrisman, R. R., Harrisburg.
Callahan, George, Philadelphia.
Connelly, John, Hyde Park.
Darlington, J. Lacy, West Chester.
Davis, Atlee G., Philadelphia.
Dettry, Henry F., Philadelphia.
Dickey, E. V., Oxford.
Derbyshire, A. J., Philadelphia.
Durar, Enoch, Philadelphia.
Dallett, John, Philadelphia.
Devereux, John, Philadelphia.
Devereux, James, Philadelphia.
Deal, Daniel, Philadelphia.
Dasher, David, Harrisburg.
Drinker, H., Montrose.
Driesbach, Daniel G., Beach Haven.
Davis, William L., Easton.
Dœbler, V. S., Williamsport.
Dunlap, H. E., Newberry.
Davis, John L., Newberry.
Du Bois, John, Williamsport.
Datesman, Robert, Milton.
DeHaven, Jehu, Harrisburg.
Dempster, Robert, Phillipsburg, N. J.
Duncan, J. L., M. D., Pittsburgh.
Demees, John, Shamokin.
Darlington, H., Pittsburgh.
Davis, Joseph H., Pittsburgh.
Dull, J. J., Harrisburg.
Dougherty, James, D., Harrisburg.
Dougherty, Daniel, Harrisburg.
Deitz, George A., Chambersburg.
DuBarry, J. N., Harrisburg.
Eli, Richard E., Philadelphia.
Evans, David, Philadelphia.
Edwards, William A., Philadelphia.
Ellis, William, Philadelphia.
Evans, John, York.
Elwyn, A. L., Philadelphia.
Eby, Jacob R., Harrisburg.
Eichbaum, William, Pittsburgh.
Eberly, Christian, Cumberland.
Everhart, J. T., Pittston.
Engle, Charles K., Bustleton.
Ellis, B. Morris, Hughesville.
Earley, Martin, Palmyra.
Eddy, George W., Philadelphia.
Ensworth, L. A., Williamsport.
Eves, George S., Williamsport.
Embick, Frederick E., Williamsport.
Eldred, Charles D., Williamsport.
Elder, Mathias, Williamsport.
Edwards, Charles, Williamsport.
Elliott, William G., Williamsport.
Eveland, S. D., Williamsport.
Evender, Thomas, Williamsport.
Epes, William J., Williamsport.
Elser, D. B., Williamsport.
Eckert, Isaac, Reading.
Evans, Robert, Erie.
Ever, Andrew, Muncy.
Elder, James, (Swatara,) Harrisburg.
Elliott, B. A., Pittsburgh.
Elliott, W. R., Pittsburgh.
Estep, J. P., Pittsburgh.
Etter, B. F., Harrisburg.
Emminger, John, Hogestown.
Early, D. S., Hummelstown.
Egle, W. H., M. D., Harrisburg.
Ensminger, J. T., Harrisburg.
Emminger, W. H., Harrisburg.
Edwards, Oliver, Harrisburg.
Engelbert, A. F., Wiconisco.
Fager, George C., Harrisburg.
Fertig, John, Titusville.
Freas, P. R., Germantown.
Frantz, Jacob, Mount Hope, Lancaster co.
Fotterall, Stephen G., Philadelphia.
Foster, Frank T., Philadelphia.
Failes, George, Philadelphia.
Fallon, Christ'r U., Darby, Delaware co.
Flenniken, J. C., Waynesburg, Greene co.
Felton, S. M., Philadelphia.
Fulton, Andrew, Pittsburgh.
Firmstone, William, Easton.
Fleming, Robert, Williamsport.
Fessler, Philip, Williamsport.
Forseman, Robert M., Williamsport.
Fisher, John S., Williamsport.
Forseman, D. W., Williamsport.
Foresman, John, Williamsport.
Foresman, Daniel F., Slifer, Union co.
Forseman, R. S., Williamsport.
Fuller, J. W., Montoursville.
Farrell, John, Pittsburgh.
Fass, G., Allegheny city.
Frisch, B., Harrisburg.
Fisler, J. E., Harrisburg.
Fisler, Amos, Harrisburg.
Fleming, Dr. James, Harrisburg.
Flickinger, Samuel, Harrisburg.
Fisher, John R., Harrisburg.
Fox, Richard, Hummelstown.
Feeman, Valentine, Harrisburg.
Fellowes, J. Turney, Scranton.
Fiske, A. R., Harrisburg.
Gowen, James, Mount Airy, Philadelphia.
Grout, H. T., Philadelphia.
Gries, John M., Philadelphia.
Grigg, John. Philadelphia.
Grigg, John Warner, Philadelphia.
Glass, Alexander F., Philadelphia.
Garber, Jacob B., Columbia.
Gillespie, James, Philadelphia.
Gould, J. E., Philadelphia.
Gross, Daniel W. Harrisburg.
Gilbert, Henry, Harrisburg.
Gardner, Jacob, Pittsburgh.
Goe, John S., Brownsville.
Goe, John S., jr., Brownsville.
Gould, Stephen, Williamsport.
Gould, John, Luzerne co.
Gehr, D. O., Chambersburg.
Garis, David, Easton.
Gilmore, Joseph, Williamsport.
Grier, James, Newberry.
Gibson, C. E., Williamsport.
Gould, Robert S., Williamsport.
Gibson, John, Williamsport.

Garman,Samuel, Williamsport.
Gould, Alexander S., Hickory Run, Lycoming co.
Gregg, Theodore, Bellefonte.
Guernsey, H. A., Philadelphia.
Gaynor, Edward J., Easton.
Greenawalt, Alex., Allegheny city.
Glenn, John McDonald, Pittsburgh.
Glenn, Robert W., Noblestown.
Grove, M. M., Harrisburg.
Gohl, A., Harrisburg.
Garman, John, Hyde Park.
Griffin, Henry, Scranton.
Germyn, John, Rushdale.
Gibbs, J. W., M. D., Hyde Park.
Gregory, J. W., Scranton.
Griest, Chas. W., York Sulphur Springs.
Hammond, John W., Erie.
Haldeman, Jacob S., New Market.
Heister, A. O., Harrisburg.
Hutchinson, J. Pemberton, Philadelphia.
Hickok, W. O., Harrisburg.
Hacker, William, Philadelphia.
Harvey, Chalkey, Chaddsford.
Haseltine, John, Philadelphia.
Hart, William H., Philadelphia.
Hoopes, Thomas P., Philadelphia.
Hamilton, A. Boyd, Harrisburg.
Hoffman, H. W., Harrisburg.
Haldeman, Jacob M., Harrisburg.
Haddock, D., jr., Philadelphia.
Hall, Geo. E., Philadelphia.
Hiester, F. A. M., Reading.
Haehnlen, Frederick, Harrisburg.
Hoffer, John, Harrisburg.
Hamilton. Hays, Huntingdon Furnace.
Haldeman, S. S., Columbia.
Hicks, James, Pittston.
Hutchins, Thomas, Wyoming.
Harvey, E. B., Wilkes-Barre.
Hollenback, George M., Wilkes-Barre.
Hitner, Henry S., Barren Hill.
Holstein, William H., Bridgeport.
Hartranft, Samuel E., Norristown.
Haehnlen, Jacob, Harrisburg.
Hackett, J. M., Easton.
Hetrich, Josiah P., Easton.
Hutter, William H., Easton.
Hartman, John, Williamsport.
Hartman, Mathias, Catawissa.
Herdic, Peter, Williamsport.
Hill, Theodore, Williamsport.
Hall, John B., Williamsport.
Hudson, Joseph E., Williamsport.
Hagerman, Augustus H., Williamsport.
Heidler, David, Williamsport.
Holden, H. L., Williamsport.
Hays, J. W., Williamsport.
Huling, Louis G., Williamsport.
Hinkle, John R., Newberry.
Higgins, William C. Williamsport.
Huyck, George, Newberry.
Hull, Joseph F. Hull's Mill.
Hepburn, Andrew, Williamsport.
Harrington, Thomas L., Williamsport.
Heylmun, E. G., Crescent, Lycoming co.
Howell, A., Williamsport.
Howland, Rausford, Williamsport.
Hastings, H. S., Williamsport.
Holliday, B. B., Wellsboro'.
Hepburn, John, Williamsport.
Hagy, Philip, Williamsport.
Hull, W. R., Cogan Station.
Hise, Adam, Williamsport.
Hamilton, Cyrus E., Williamsport.
Hoffman, Philip, Williamsport.
Hester, Joseph M., Easton.
Helick, Reuben, Easton.
Higgins, William V., Williamsport.
Hemingway, E. E., Easton.
Hugus, P., Pittsburgh.
Hale, James P., Osceola, Clearfield co.
Higgins, William V., Williamsport.
Herr, Henry, Harrisburg.
Hummel, Richard H., Harrisburg.
Hummel, William, Harrisburg.
Hickman, Amos S., Monticello, Illinois.
Hynicka, George, Harrisburg.
Hummel, S. A., Harrisburg.
Haehnlen, William E., Harrisburg.
Hamilton, Hugh, Harrisburg.
Hargest, William F., Harrisburg.
Hostic, John, Harrisburg.
Herr, D. S., Harrisburg.
Hummel, Alfred, Harrisburg.
Hall, John W., Harrisburg.
Heck, Lewis, M. D., Dauphin.
Hamilton, T. A., Harrisburg.
Hain, George, Lower Paxton, Dauphin co.
Hoffman, H. B., Millersburg.
Hunter, George W., Harrisburg.
Hutchinson, J. W., Harrisburg.
Hildrup, W. T., Harrisburg.
Halstead, N., Scranton.
Hill, J. F., Scranton.
Halstead, W. F., Scranton.
Ingersoll, Harry, Philadelphia.
Irwin, James, Philadelphia.
Innis, John A., Easton.
Jordan, John, Philadelphia.
Jefford, A. M., Wyoming.
Jenkins, G. S., Wyoming.
Jenkins, Steuben, Wyoming.
Jones, Daniel, Exeter, Luzerne county.
Jessup, William H., Wilkes-Barre.
Jackson, George D., Dushore, Sullivan co.
Johnston, William, Easton.
Jones, John E., Williamsport.
Jarrett, John, Hepburn, Lycoming co.
Jones, Samuel, Williamsport.
Jamison, Edward, Newberry.
Jamison, L., Williamsport.
Jetter, Tinsley, Bethlehem.
Jones, B. F., Pittsburgh.
Jordan, Thomas J., Harrisburg.
Knapp, Amos E , Northumberland.
Kramer, Philip, Philadelphia.
Keim, George M., Reading.
Knight, William H., Philadelphia.
Kimball, Stephen, Philadelphia.
Kelly, Charles, Kellyville, Delaware co.
Knox, Thomas P., Norristown.
Knight, Edward C., Philadelphia.
Keller, John S., Orwigsburg.
Kunkle, Benjamin S., Harrisburg.
Knapp, D. B , Williamsport.
King,C. M.,White Deer Mills,Centre co.
Kinyon, S. C.,Williamsport.
Kunsman,William H.,Easton.
Kelly,Dennis,Kellyville,Delaware co.
King,Alexander,Pittsburgh.
Kreybill,Jacob E.,Marietta.
Knipe,Joseph F.,Harrisburg.
Koller,Henry M., Harrisburg.
Kuhn,William,Harrisburg.
Keely,Jerome,Union Deposit, Dauphin co.

Kirby, William C., Harrisburg.
Kepple, John, Harrisburg.
Kirkpatrick, J. D., North Liberty, Mercer county.
Kelker, Immanuel, Harrisburg.
Lukenbaugh, Chas. Augustus, Bethlehem.
Longstreth, John, Bristol.
Lauman, George M., Harrisburg.
Lauguerrene, P. L., Philadelphia.
Lancaster, J. B., Philadelphia.
Linn, Philip, Harrisburg.
Lafrance, Isaac T., Wyoming.
Lee, Washington, jr., Wilkes-Barre.
Leacock, J. R., Wyoming.
Longaker, A. Brower, Norristown.
Line, J. M., Allentown.
Lawell, Edward, Easton.
Lerch, Frederick, Easton.
Logan, Millard F., Williamsport.
Lowe, Ellis S., Williamsport.
Love, Samuel, Williamsport.
Lyon, Thomas, Williamsport.
Lippencott, Edward, Williamsport.
Lentz, George W, Williamsport.
Lehman, M., Williamsport.
Levan, E. M. D., Williamsport.
Long, Henry B., Pittsburgh.
Long, W. J., Osceola, Clearfield co., Pa.
Lamberton, Robert A., Harrisburg.
Lauer, Fred'k W., Reading.
Marvin, Seldon, Erie.
McAllister, H. N., Bellefonte.
Marshall, William, Bellefonte.
Meredith, James M., West Chester.
McKinley, Isaac G., Harrisburg.
Miles, James, Girard, Erie county.
McIlvaine, Abram R., Brandywine Manor, Chester county.
McGowen, John, Bridesburg, Philadelphia.
Murdock, John, jr., Pittsburgh.
Myers, Joseph B., Philadelphia.
Mellor, Thomas, Philadelphia.
Mellon, Thomas, Philadelphia.
Magee, James, Philadelphia.
McCully, Francis G., Philadelphia.
Messchart, H., Philadelphia.
McKean, H. P., Philadelphia.
McKean, Samuel M., Williamsport.
Martin, George H., Philadelphia.
McCrea, William H., Philadelphia.
McIntyre, Peter, York.
McFarland, John, Ligonier.
Middleton, E. P., Philadelphia.
Magee, George, Philadelphia.
Muhlenberg, H. H., Reading.
McDowell, John, Washington.
Murray, Wm. F., Harrisburg.
McAllister, Archibald, Springfield Furnace, Blair county.
Metzgar, Wm., Harrisburg.
Murdock, A. C., Pittsburgh.
Merrick, George, Northumberland.
McAllister, John C., Fort Hnnter, Dauphin county.
Maxwell, Henry D., Easton.
Myers, Henry, Forty Fort.
Marcy, Ira, Wilkes-Barre.
McCrea, James A., Philadelphia.
Martin, Dewees J., Allentown.
Mutchler, John, Easton.
McMinn, J. M., Williamsport.
Mudge, Hiram, Williamsport.
Munday, J. S., Williamsport.
McLowell, Lewis, Williamsport.
McCormick, Robert, Montoursville.
Moore, Wesley, Newberry.
Mahaffey, David, Cogan Station.
Mahaffey, Lindsey, Newberry.
McMicken, J. B., Williamsport.
Miller, Larr, Wayne, Clinton county.
Mahaffey, William J., Newberry.
Maxwell, Jacob S., Williamsport.
Miles, James, Milesgrove.
Morse, H. S., Williamsport.
Montgomery, J. B., Williamsport.
Munday, H. F., Williamsport.
Morrison, S. G., Williamsport.
Morris, John C., Friendsville.
McCauley, George W., Harrisburg.
Messinger, Samuel, Easton.
McCain, Daniel, Allegheny city.
McKelvey, James, Wilkinsburg, Allegheny county.
Morris, D. B., Pittsburgh.
McPherson, J. S., Wilkins.
McNish, A. L., Pittsburgh.
Marchand, John, Pittsburgh.
Magan. David, New Brighton, Beaver co.
McFarland, John, Northumberland.
Montgomery, Joseph, Harrisburg.
Motter, John, Harrisburg.
Mark, George M., Harrisburg.
Middleton, Richard, Harrisburg.
Miller, William H., Harrisburg.
Mumma, David, Harrisburg.
McFarland, George F., Harrisburg.
McConkey, Elbridge, Harrisburg.
McDonald, Lewis, Harrisburg.
McCormick, David, Harrisburg.
Miller, J. G., Harrisburg.
McCormick, James, Harrisburg.
Morse, L. W., Ledgedale, Wayne co.
Newbold, A. T., Philadelphia.
Neilson, Robert, Philadelphia.
Neff, Robert K., Philadelphia.
Newton, G. B., Springfield, Delaware co.
Noble, John, Carlisle.
Noble, F. W., Easton.
Nissley, John J., Hummelstown.
Nicely, George W., Newberry.
Nutting, Lyman, Pine Grove, Schuylkill county.
Nichols, Joseph, Williamsport.
Nichols, W. F., Williamsport.
Neilman, D. H., Easton.
Nissley, Joseph, Harrisburg.
Opp, George S., Maryland, Lycoming co.
Osthout, Jacob H., Harrisburg.
Odenwelder, Henry L., Easton.
Olwine, Benjamin, Harrisburg.
Ott, Leander N., Dauphin county.
Packer, William F., Williamsport.
Pritchett, Borradaile, Frazier, Chester co.
Perrot, W. S., Philadelphia.
Pennock, Samuel, Kennet Square, Chester county.
Pratt, Thomas, Philadelphia.
Pomeroy, John L., Philadelphia.
Peyson, Augusta, Philadelphia.
Patterson, Robert, Philadelphia.
Physic, Emlen, Philadelphia.
Presbury, George G., jr., Philadelphia.
Priestly, J. R., Northumberland.
Parsons, H. K., Harrisburg.
Peters, Benjamin G., Harrisburg.

Pennock, Joseph, Harrisburg.
Patterson, Robert H., Pittsburgh.
Powell, Robert H., Philadelphia.
Paxton, Joseph, Catawissa.
Polen, Albert, Wyoming.
Peters, C. P., Concordsville.
Potts, E. Channing, Norristown.
Parsons, Leroy, Harrisburg.
Pyle, R. C., Easton.
Purcell, Sylvester, Bloomsburg.
Parsons, Henry C., Williamsport.
Piatt, John, Williamsport.
Pollock, Samuel, Williamsport.
Porter, John F., Newberry.
Parker, Samuel J., Williamsport.
Perkins, H. J., Williamsport.
Perkins, James H., Lemar.
Page, A., Williamsport.
Post, G. S., Williamsport.
Parke, John E., Pittsburgh.
Patterson, Lebanon Church, Allegheny county.
Phelps, W. H., Pittsburgh.
Pemberton, Clifford, Pittsburgh.
Phillips, John, Pittsburgh.
Power, John, Harrisburg.
Parsons, George W., Harrisburg.
Rogers, C. B., Philadelphia.
Roberts, Algernon S., Philadelphia.
Rutherford, John P., Harrisburg.
Rice, John, Philadelphia.
Rice, William, Philadelphia.
Roberts, Isaac, Norristown.
Rudman, William C., Philadelphia.
Robeson, H. P., Robesonia, Berks co.
Rodgers, Fairman, Philadelphia.
Rhodes, William A., Philadelphia.
Ripka, Joseph, Philadelphia.
Remington, Thomas P., Philadelphia.
Ronaldson, Richard, Philadelphia.
Reif, C. P., Philadelphia.
Rutherford, S. S., Harrisburg.
Rutherford, Abner, Harrisburg.
Reily, John A., Harrisburg.
Robb, Jacob, Pittsburgh.
Robinson, ——, Philadelphia.
Rutter, Nathaniel, Wilkes-Barre.
Ross, William S., Wilkes-Barre.
Rutherford, John B., Harrisburg.
Ruggles, A. C., Williamsport.
Rutherford, W. F., Paxton.
Reighard, James B., Newberry.
Reighard, Daniel, Newberry.
Renninger, W. H., Williamsport.
Rook, D. N., Williamsport.
Rank, L. D., Williamsport.
Rouse, William A., Harrisburg.
Reed, Alexander, Lock Haven.
Rodenbough, Joseph S., Easton.
Reeder, Mrs. A. H., Easton.
Richards, Henry, Easton.
Reigel, Joseph, Easton.
Roth, Jeremiah, Allentown.
Rogers, Phelix, Pittsburgh.
Rowley, Thomas A., Pittsburgh.
Russell, Alexander L., Harrisburg.
Rogers, Lucius, Smethport, McKean co.
Raymond, James, Harrisburg.
Reel, Augustus, Harrisburg.
Rutherford, William S., Harrisburg.
Reel, John, Harrisburg.
Reed, James, Middle Paxton, Dauphin co.
Reichenbach, E. C. Harrisburg.
Rudy, Joseph, Harrisburg.
Rupp, Henry S., Shiremanstown, Cumberland county.
Rutherford, J. E., Harrisburg.
Rhey, Geo. Millwood, Westmoreland co.
Richmond, William H., Carbondale.
Rand, George W., Scranton.
Reed, E. W., Erie.
Savery, Peleg B., Philadelphia.
Stambaugh, S. C., Lancaster.
Sergeant, William, Philadelphia.
Strouble, Jacob, Zion, Centre county.
Snow, Edward K., Philadelphia.
Sharp, Joseph W., Philadelphia.
Stavely, William, Lahaska, Bucks county.
Smith, Daniel, jr., Philadelphia.
Smith, Thomas, Philadelphia.
Scull, Gideon, Philadelphia.
Silverthorn, M. H., Fairview, Erie co.
Simmons, A. H., Philadelphia.
Starr, Isaac, Philadelphia.
Shoemaker, B. A., Philadelphia.
Schaffer, W. L., Philadelphia.
Smith, Geo., Upper Darby, Delaware co.
Sheridan, Owen, Philadelphia.
Speer, William, Pittsburgh.
Spencer, S. S., Lancaster.
Swift, Joseph, Philadelphia.
Struthers, William, Philadelphia.
Slade, Alfred, Philadelphia.
Stuart, George H., Philadelphia.
Small, Samuel, York.
Sharwood, Dendy, Philadelphia.
Stone, Daniel, Philadelphia.
Speer, Alexander, Pittsburgh.
Stokes, William A., Greensburg.
Sturdevant, E. W., Wilkes-Barre.
Sheets, J. H. Von, Orwigsburg.
Shoemaker, William M., Wyoming.
Sturdevant, E. J., Wyoming.
Speece, L. B. Wyoming.
Smith, J. B., Dunmore.
Shoemaker, Wm. S., Wyoming.
Schooley, J. B., Wyoming.
Smith, J. B., Plymouth.
Shoemaker, Elijah, Kingston.
Sharp, John, jr., Wyoming.
Stark, J. B., Wilkesbarre.
Stephens, Z., Scranton.
Sower, F. D., Norristown.
Schall, David, Norristown.
Schreiber, O. L., Laubach, Northampton county.
Sigman, Joseph, Easton.
Snyder, Daniel W., Easton.
Schreiner, J. W., Lewisburg.
Singer Manufacturing Co., Philadelphia.
Swan, Rufus C., Williamsport.
Sheffler, A. G., Williamsport.
Smith, Henry B., Williamsport.
Smith, Joseph W., Newberry.
Stearns, L. L., Williamsport.
Stewart, Robert, Lemar.
Showers, Jesse, Rauch Gap.
Smith, Thomas, Williamsport.
Showers, D. H., Williamsport.
Smith, Daniel W., Williamsport.
Saxton, J. O., New Kingston.
Shaw, Hugh, Jersey Shore.
Smith, J. D. L., Mill Hall.
Seltzer, George L., Myerstown.
Seitz, George, Easton.
Seitz, Frederick, Easton.

Serch, David, Easton.
Scott, John, Pittsburgh.
Sharpless, S. J., Street Road, Chester co.
Smith, George, New York city.
Seiler, Daniel W. Harrisburg.
Shoemaker, John, Harrisburg.
Scheffer, Theodore, Harrisburg.
Smith, Jacob, Harrisburg.
Shaffer, William S., Harrisburg.
Simon, John B., Harrisburg.
Smull, John A., Harrisburg.
Shellenberger, Henry, Harrisburg.
Scott, George, Catawissa.
Sharp, Samuel W., Newville.
Sheck, J. H., Harrisburg.
Silkman, William M., Scranton.
Thompson, John I., Half Moon, Centre co.
Thomas, George, Belvidere, Chester co.
Thatcher, Richard, Marsh, Chester co.
Toppan, Charles, Philadelphia.
Thompson, N. B., Philadelphia.
Tatham, H. B., Philadelphia.
Tatham, George N., Philadelphia.
Towers, William H., Philadelphia.
Taggart, David, Northumberland.
Taggart, John, Northumberland.
Tasker, Thomas T., Philadelphia.
Tripp, Ira, Scranton.
Trout, Michael C., Sharon, Mercer county.
Tyson, Carrol S., Norristown.
Thomas, Henry, Harrisburg.
Templin, James R., Easton.
Taylor, Benjamin H., Williamsport.
Taylor, Horace E., Williamsport.
Thompson, James, Cogan Station.
Trump, Edward D., Jersey Shore.
Tinsman, Garrett, Williamsport.
Tinseley, Peter, Bethlehem.
Thayer, Russell A., Allentown.
Templin, William, Harrisburg.
Taylor, William, Womelsdorf. Berks co.
Taylor, B. Frank, Womelsdorf.
Taylor, George R., Womelsdorf.
Tracy, John A., Erie.
Urquehart, John, Wilkes-Barre.
Updegraff, A., Wilkes-Barre.
Updegraff, Thomas, Newberry.
Updegraff, Daniel, Newberry.
Updegraff, Derrick, Newberry.
Unger, David J., Harrisburg.
Unger, John G., Harrisburg.
Van Leer, Isaac W., Wallace, Chester co.
Vouges, James C., Philadelphia.
Vanvoorhis, H. B., Pittsburgh.
Vanscoy, Daniel, Wyoming.
Van Voree, John, Williamsport.
Van Buskirk, S., Williamsport.
Vandike, James, Northumberland.
Walker, George, Montrose.
Watts, Frederick. Carlisle.
Walker, R. C., Elizabeth, Allegheny co.
Wood, Robert, Philadelphia.
Waterman, Joseph, Philadelphia.
Wister, Richard, Philadelphia.
Watson, Johanna, Philadelphia.
Welsh, William, Philadelphia.
Welsh, John, Philadelphia.
Welsh, Samuel, Philadelphia.
Woodward, George W., Philadelphia.
Weaver, H. A., Pittsburgh.
Wright, Joshua, Washington county.
Watson, A. W., Harrisburg.
Walters, S. H., Northumberland.
Wright, Joshua, Findleyville, Washington county.
Waterman, Albert G., Philadelphia.
Wood, Thomas, Penningtonville.
Woodhams, Samuel, Plymouth.
Williams, Stiles, Wilkes-Barre.
Wright, H. B., Wilkes-Barre.
Waters, Towsend, West Chester.
Wetherill, William, Norristown.
Wentz, Thomas H., Norristown.
Whitman, Joseph, Centre Valley P. O.
Williams, E. C., Harrisburg.
Woodward, John V., Williamsport.
Watson, Oliver, Williamsport.
White, Henry, Williamsport.
Wolf, Peter, Williamsport.
Wingard, Samuel C., Williamsport.
Watson, Henry W., Williamsport.
Weaver, M. B., Williamsport.
White, John, Williamsport.
Wait, B., Williamsport.
Wood, James M., Williamsport.
Westcott, Thos. S., Ashland, Schuylkill county.
Ward, C. L., Towanda.
Workheiser, Enos, Easton.
Wallace, W. W., Pittsburgh.
Withington, W. P., Shamokin.
Way, John, jr., Pittsburgh.
White, J. A. G., Osceola, Clearfield co.
Wallower, John, Harrisburg.
Winters, George, Harrisburg.
Wolfinger, Levi, Harrisburg.
Wible, William, Gettysburg.
Watts, William M., Mechanicsburg.
Warford, A. B., Harrisburg.
Wolf, William, Harrisburg.
Wilhelm, A., Cornwall.
Walker, John H., Erie.
Waggoner, John A., Harrisburg.
Yeager, Joseph, Philadelphia.
Young, Alexander, Philadelphia.
Yeaton, William H., Philadelphia.
Youngman, George W., Williamsport.
Young, William, Easton.
Young, John, jr., Ewing's Mills, Allegheny county.
Young, James, Middletown.
Ziegler, John H., Harrisburg.
Zimmerman, F., Williamsport.
Zimmerman, A. M., Harrisburg.
Zerbe, Cyrus, Harrisburg.

TRANSACTION OF THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY, 1878.

HARRISBURG, *January 15, 1878, 7, P. M.*

At this hour, the president of the society, called the meeting to order, the following named persons being present: Messrs. McCrea, Blight, Kennedy, Levering, Holstein, Barto, Tripp, Keller, Smull, Miller, Gehr, Rhey, Murdoch, McDowell, Lawson, Kirkpatrick, Edge, J. S. Haldeman, Knox, A. B. Hamilton, Kapp, Morris, Eby, Wilhelm, A. Rutherford, Taylor, J. B. Rutherford, McConkey, Egle, and Seiler.

The minutes of the last meeting were read and approved.

The committee to whom was referred the matter of renting a suitable room for the permanent office of the society, reported that duty performed, and that satisfactory arrangements had been concluded with the owners of the property now occupied by the society.

On motion, the report was accepted and confirmed, and the committee discharged.

Mr. McCREA, chairman Committee on Centennial Awards, reported that the awards as made were published in the twelfth volume of the transactions of the society, and that the treasurer of this society had paid the premiums so awarded.

On motion, the report was accepted, and the committee discharged.

The committee to inquire into the facts and character of legislation created in other States in the interest of agriculture beg leave to be continued until to-morrow.

Which was agreed to.

Mr. KNOX, chairman of the Committee on Plows and Plowing at the late exhibition, asked leave to read a letter from E. D. Meachem, manager South Bend iron-works, Mansfield, Ohio, requesting that the awards made by the committee, and reversed by the Executive Committee, be re-considered.

Which was agreed to.

After discussion and explanation of the subject,

On motion of Mr. KNOX, seconded by Mr. EBY, the matter was adjusted by the award of a bronze medal.

A communication from the New York College Veterinary Surgeons was read, together with letter from T. S. Cooper, Coopersburg, Pennsylvania, in which said institution, through its secretary, offers to this society a scholarship therein free of charge.

Mr. SMULL, moved that the Secretary be instructed to acknowledge the receipt of said communications, with the acknowledgments of the society, that the proposal therein contained be accepted, and that the Librarian be also authorized to forward to the college a full set of the reports of our transactions.

Which was agreed to.

On motion of Mr. McCONKEY, a committee consisting of Messrs. McCrea, Wilhelm, and Knox was appointed, with power to select a suitable person on whom the scholarship should be conferred.

Mr. EGLE, chairman of committee to draft suitable resolutions on the decease of Joseph P. Conner, late a Vice President of the society, submitted the following report; which was adopted unanimously:

Resolved, That this society has learned, with sincere regret, of the decease of another valued member, Vice President Joseph P. Conner, of

Fowlersburg, Columbia county, a warm friend of agricultural science, an enterprising and influential citizen, and an upright christian gentleman, whose practical advice and counsel during the three years of his official connection with us won our esteem and friendship; we, therefore, place this record upon our minutes in honor to his memory, and direct that a copy of the same be forwarded to his family, under the seal of the society.

On motion, the president appointed Messrs. Barto, Kirkpatrick, and Miller a committee to audit the accounts of the treasurer for the past year; also,

Messrs. Branson, Abner Rutherford, and Tripp, a committee to conduct the annual election for members of the executive committee for the ensuing year.

A letter from Thomas A. Bemus, Ripley, New York, was read by the Secretary, referring to his claim to an award in the sheep classes at the last exhibition, and on motion, referred to Messrs. Branson and Abner Rutherford, chairmen of the classes, respectively, who reported that a premium of twenty dollars should be awarded said exhibitor, which,

On motion of Messrs. Holstein and Kirkpatrick, was agreed to.

The claim of Joseph F. Kolb, of Erie, having been read and presented, it was, on motion of Mr. J. S. Haldeman, referred to the President, with power to adjust the same.

Mr. BARTO moved that a committee of three be appointed to select and rent a suitable room for the use of the Executive Committee.

Which was amended by Mr. SMULL: "That the Recording Secretary be authorized to procure a suitable room, at a rental not to exceed the sum of $250 per annum." Which amendment being accepted, the resolution was agreed to.

Mr. KIRKPATRICK, to whom was referred the grievance of C. & G. Cooper & Co., of Mount Vernon, Ohio, exhibitors of a traction engine at the last fair, reported that, in his judgment, the award should be increased from a diploma to a silver medal.

After some explaination of the ingenuity displayed in the construction of the article, and its superior merit and desirable movement,

On motion of Messrs. SEILER and HOLSTEIN, the recommendation was adopted, and the Corresponding Secretary directed to carry the same into effect.

Mr. SEILER, Recording Secretary, called the attention of the committee to the fact that a bill had recently been introduced into the lower branch of the Legislature, providing for the printing of the report of the State Board of Agriculture, and that a proposition to amend the same, by providing an equal number of the reports of the State Agricultural Society (Volume No. 13) had been offered in Committee of Agriculture of that body, and defeated by the efforts of a member of the State Board also a member of that committee, and that while this society had never antagonized the State Board, on the contrary, had extended courtesies toward it, it seemed that the Board was acting in a very incomprehensible manner, and intimated that it intended, if possible, to make the society tributary to its influence.

Mr. THOMAS J. EDGE, Secretary of the Board, and a Vice President of the Society, being present, desired to state that he spoke officially for the former, and desired to be understood that it disclaimed any such purpose in any manner whatsoever, and that, on the contrary, the board desired to maintain friendly relations with the society as a kindred organization, having the same purposes and objects in view, though working in different channels.

After this statement, on motion, a communication was read from the *American Republican*, a paper published in West Chester, to which article was attached the signature of John P. Edge, the member of the Board referred to, in which a statement is gratuitously made that "this Society, as at present conducted, was worthless for good, costing more than it comes to, that the State Agricultural College was a double disgrace, a financial sink," &c.

This was replied to by Mr. BRANSON, who stated that while the subject was pending discussion, he desired to state that the *animus* of the board could be fairly ascertained from the published sentiments contained in the letter he then held in his hand, and that while he stigmatizes the Pennsylvania State Agriculture College and the State Society as a "burning shame and double disgrace to the State," I ask the question, why in the creation of his "new and undefiled" organization, he especially stipulates that three of the members of the old institutions he to so wantonly and ignorantly stigmatizes shall be members of the new board thus created. Is it possible that an honest parent would thus knowingly corrupt his bantling and first-born pet with such evil and vicious associations?

Referring to the history of the society since the date of its organization, Mr. BRANSON showed from the records that the society had held, successfully, exhibitions for a period covering more than twenty-five years, that during that time the sum total of appropriations by the State had not reached the sum of $50,000; while in the same time the society had disbursed in premiums, &c., to the public, more than $525,000, (and as Mr. Haldeman, ex-president, has just said,) nearly $23,000 to the State College and experimental farms, together with $900 to the centennial exhibition. It has in this manner, by the liberal award of premiums and inducements, offered to manufacturers of improved machinery, agricultural and other useful articles and implements, as well as to the breeders of fine and pure stock, afforded a market to the farmer and manufacturer, which has been of incalculable benefit to the individual, as well as to the State. The distribution of stock, seeds, implements, and other similar articles, accomplished through its medium, (which is not contemplated and cannot be performed by the new organization, as it expressly states) in its previous exhibitions, have contributed in an eminent degree to the improvement of all branches of agriculture in every locality where its exhibitions have been held, as the individual and combined testimony of every member of this Executive Committee will undoubtedly agree.

In conclusion, I would say that I think, also, after repelling the unjust and untrue assertions offered in the letter referred to, that it would be unwise and unjust to antagonize the State Board, which has been just created for a kindred purpose for which this society itself was established. We should let it stand or fall on its own merits; and as a member of our own organization, I cannot see any good objection to a joint publication embracing our own transactions, those of the Board, fruit growers, wool growers, State dairymen, &c.

Mr. SMULL stated that the society had never yet shown any antagonism to the State Board, and he trusted they would be able to work in a common interest, with a harmony that would be creditable to each alike.

Mr. RHEY offered a resolution, requesting the Legislature to abolish the State Board, as the act creating the same was not only unconstitutional, but unnecessary, and that the same object could be attained (for which it was alleged it was created) through the Bureau of Statistics, which was properly officered and equipped for that purpose, and that the repeal would mitigate and lighten the burdens already imposed upon the people.

If the gentleman, through whose instrumentality it was created could show that its creation and maintenance would subserve the interests of agriculture better than the same could be obtained through the Bureau, and a more solid and better statement of facts furnished than could be ascertained by the latter, he would indorse it, but not until then.

Mr. KELLER, a member of both the State society and the Board, expressed his belief that it was the intention of the latter, if possible, to supplant the society.

After some further discussion, the hour of adjournment having nearly arrived, Mr. RHEY withdrew his resolution for the present.

On motion, Mr. KNOX, the committee then adjourned.

HARRISBURG, *January 16, 1878, 10, A. M.*

The annual meeting of the society convened at this hour, and was called to order by Mr. Seiler.

On motion, Mr. Holstein was designated to preside over the election and such other matters as might be presented for consideration and action.

The time specified for opening the polls (ten o'clock, A. M.,) having arrived, they were declared duly opened. At twelve o'clock, the time mentioned for closing the same, they were duly closed, when the officers declared the following result:

For President.

	Votes.
John W. Hammond received,	78

For Vice Presidents.

	Votes.
1. James A. McCrea received,	78
2. George Blight “	78
3. A. L. Kennedy “	78
4. William S. Bissell “	78
5. A. D. Levering “	78
6. D. H. Branson “	78
7. William S. Holstein “	78
8. Tobias Barto “	78
9. S. S. Spencer “	78
10. Daniel H. Neiman “	78
11. D. J. Waller “	78
12. Ira Tripp “	78
13. J. S. Keller “	78
14. John A. Smull “	78
15. James E. Carmalt “	78
16. F. A. Allen “	78
17. J. A. Lemon “	78
18. John S. Miller “	78
19. Daniel O. Gehr “	78
20. L. A. Mackey “	78
21. George Rhey “	78
22. John Murdoch, jr., “	78
23. W. W. Speer “	78
24. John McDowell “	78
25. J. B. Lawson “	78
26. J. D. Kirkpatrick “	78
27. C. M. Reed “	78

For Additional Members Executive Committee.

	Votes.
A. Wilhelm received,	78
Abner Rutherford received,	78
John H. Zeigler “	78
William Taylor “	78
R. S. Allen “	78

Ex-Presidents Members of the Board.

Frederick Watts received,	78
D. Taggart “	78
Thomas P. Knox “	78
A. Boyd Hamilton “	78
Amos E. Kapp “	78
John C. Morris “	78
J. R. Eby “	78

For Treasurer.

John B. Rutherford received, ... 78

For Corresponding Secretary.

Elbridge McConkey received, ... 78

For Recording Secretary.

D. W. Seiler received, ... 78

For Chemist and Geologist.

S. S. Haldeman received, ... 78

For Assistant Chemist and Geologist.

Hugh Hamilton received, ... 78

For Librarian.

William H. Egle received, ... 78

(Signed)

IRA TRIPP,
ABNER RUTHERFORD,
DAVID H. BRANSON.

A certificate to this affect was then duly prepared and executed.

The committee to audit the account of the treasurer then presented the following report:

JOHN B. RUTHERFORD, *Treasurer, in account with Pennsylvania State Agricultural Society.*

	Dr.	
1877.		
January—To balance in treasury,	$3,898 95	
September—Proceed of exhibition at Erie, from sales of single admissions, annual membership, &c.,	9,801 65	
State appropriation,	2,000 00	
Interest,	50 72	
		$15,751 32
	Cr.	
By rent of office at Harrisburg,	$205 75	
By printing, 1877,	1,101 30	
By expenses Executive Committee,	1,558 38	
By expenses President's office,	104 08	
By expenses Secretary's office, clerks, postage, &c.,	591 30	
By expenses Treasurer's office, clerks, gatekeepers, &c.,	585 00	
Premiums, 1877,	2,776 00	
Medals,	218 00	
Centennial awards and printing,	1,000 00	
Superintendents, &c.,	638 30	
Preparation of grounds and decorations,	646 52	
Transportation,	164 14	
Forage,	315 20	
Carpentry,	161 72	
Entertainment of committees,	400 00	
Marshals and police,	557 00	
Recording secretary's salary,	500 00	
Corresponding secretary's salary,	500 00	
Treasurer's salary,	250 00	
Balance,	2,478 63	
		15,751 32

The undersigned committee to audit the account of the Treasurer report that we have examined the account, compared the vouchers, and find it correct.

J. D. KIRKPATRIK,
TOBIAS BARTO,
JOHN S. MILLER.

On motion of Mr. KELLER, the report was accepted and the committee discharged.

No other business appearing,

On motion of Mr. SMULL, the meeting of the society adjourned to meet on the third Wednesday of January, 1879.

D. W. SEILER,
Secretary.

HARRISBURG, *January 16, 1878, 2, P. M.*

The President called the newly elected Executive Committee to order, at the hour above named.

The following members present: Messrs. McCrea, Blight, Kennedy, Levering, Branson, Holstein, Barto, Tripp, Keller, Smull, Miller, Gehr, Rhey, Murdoch, McDowell, Lawson, Kirkpatrick, Wilhelm, A. Rutherford, Taylor, J. S. Haldeman, Knox, A. B. Hamilton, Kapp, Morris, Eby, J. B. Rutherford, McConkey, Egle, and Seiler.

The President, on taking the chair, after the result of the election had been read, said that he desired to express his thanks to the members of the society, through the Executive Committee, which he did, as follows:

GENTLEMEN: I would be different from ordinary mankind, if I did not gratefully acknowledge the high compliment paid me in electing me, by your unanimous vote, for a second term to the presidency of the State Agricultural Society, which, for more than a quarter of a century, has been a cherished and honored institution of our great Commonwealth. Through its aid and encouragement, there has been a wonderful impetus and growth given to the development of our vast resources in agriculture, horticulture, the dairy, stock-growing, manufactures of all classes, our mineral wealth of coal, iron, and petroleum, and our varied and world-renowned industries of every description. We have aided to prove that Pennsylvania is worthy of her great position, and contains all the essential elements of wealth and prosperity. I fully appreciate the honor you have conferred upon me, and shall cherish it through life with pleasure and gratitude.

But mere words are nothing—actions are everything, and on this principle all should act. In the future, as in the past, I shall endeavor to do my whole duty. I have been familiar with the workings of your society for several years, coöperated to the extent of my humble ability in its advancement, and without any solicitation of mine, you have twice honored me with your presidency. I hope I may prove worthy of the confidence reposed in me, and will do my utmost to increase the efficiency of our organization. By the mutual efforts of hosts of good workers, many of whom I see around me, and, who, I have reason to believe will continue to exert themselves as nobly in the future as heretofore, we can perform much good for our State and people. I feel a natural diffidence, as well as pride in being called upon to preside over so large a representation of the pioneers and veterans of this old and honored society. They represent the best substantial element among our people in every section, and are men of whom their fellow citizens may justly feel proud.

I have just heard with pleasure and great satisfaction, the report of our Auditing Committee on the annual statement of our trusty and esteemed treasurer. As I anticipated, it passed their hearty approval, and is but another proof of his integrity, accuracy, and honor. Those who know him best, would not hesitate to vouch for his correctness in any statement he might make, without the formality of a detailed examination by any committee.

It is not for the display and array of our fairs, or the glitter of the bright badge which the president wears when on exhibition duty, that I am induced to accept this position. A sense of duty impels me, and I trust this sentiment actuates every member. When necessity seemed to demand, I have drawn upon my own funds and time to help forward work that was not fully provided for, and in so doing hope I have added, in my own way, to the enduring benefits of our society, in stimulating the largest development of our resources. By our exhibitions, which bring together the products of the soil, the shops, the mines, &c., for exhibition, we gain a more comprehensive idea of their vastness and variety, and the counsel of producers and manufacturers, and their comparison of views and results of experiments enables them to arrive at conclusions as to the best improved methods to be adopted in all departments. In this sense our organization is a great school where all may learn with profit, and set forth the lessons of their own experience. The advantages of a system so valuable and enlarged in operation, have been seen and acknowledged by the representatives of every nation on the globe at our great centennial.

A few months since, while on a visit to Utica, in my native State, New York, I remarked, good naturedly to some friends, that New York would have to look out for her laurels as being the Empire State—that while she had led the van in the past, yet the great variety of resources which Pennsylvania possesses, and the wonderful rapidity with which they are being developed, was destined, ere long, to give the State of my adoption the lead of all the States. And this is no idle prediction in the light of evidence presented to every careful well-informed observer.

But I will not further trespass on your time and patience than to express the hope that our present year may be crowned with greater progrees than any previous era in our history. Let us all go forward earnestly, unitedly, and with the full determination to place Pennsylvania in the front in every way.

As I learn that we have considerable work demanding our consideration and action, we will now proceed to business. What is the pleasure of the meeting in regard to the order of business?

Mr. HOLSTEIN moved that the sentiments expressed by the President receive the hearty approbation of the committee.

Which was unanimously agreed to.

Mr. KENNEDY, chairman of the committee to compare the legislation of our Commonwealth with that of other States upon matters relating to agriculture, and to suggest and recommend the passage of such laws as might prove beneficial, reported as follows:

Your committee has not been able to examine very fully the laws of the States bearing upon agriculture, and to compare them with those of Pennsylvania, but enough has been learned to prove the importance of the comparison and its value as a basis of future legislation, nor can this occasion any surprise. Many of the legislators of the thirty-eight States are largely composed of farmers, and the products of those States are largely derived from their agriculture. The art is constantly present with the members, and enactments are frequently made to promote it. Many of these applicable to a number of States exist only in one. It is obviously wise to ascertain what are applicable in our borders, and your committee will cite a single case verifying this statement. This case is that by which encouragement is given to the planting, a subject now receiving marked attention throughout the country, and is taken from the laws of our neighboring State of New York.

The enactment made in 1867, is as follows:

"Any inhabitant liable to highway tax, who shall transplant by the side of the public highway, fruit, shade, or forest trees of suitable size, shall be allowed by the overseers of highways in settlement of his highway tax, one dollar for every four trees set out; but no row of elms shall be placed nearer than seventy feet; no row of maples or other forest trees nearer than fifty feet, except locust, which may be set thirty feet apart. No allowance, as before mentioned, shall be made, unless such trees shall have been set out the year previous to the demand for such abatement of taxes, and are living and are well protected from animals at the time of such demand.

"SECTION 2. Any trees transplanted by side of the public highway as aforesaid, in place of trees which have died, shall be allowed for in the same manner and under the same conditions as in the preceding section.

"SECTION 3. No person shall be allowed an abatement of his highway tax, as aforesaid, more than one quarter of his highway tax, and no one shall receive abatement of tax for trees transplanted previous to passage of the act."

Mr. KENNEDY moved that a committee of three residing in the city of Harrisburg be appointed to present the matter to the Legislature.

Which was agreed to.

Mr. MURDOCH thought the distance between the trees was too great, and he favored an amendment by which the distance should be specified at twenty-five feet, instead of seventy feet.

Mr. SMULL thought that this being a matter to which the attention of the Legislature was to be called, and as the members of that body would fully discuss it after presentation, they would be the responsible party in the regulation of the matter of distance. This and the subject of a law to regulate fencing roads &c., was a very important one to the farmers; but at times, when a bill had been referred to a committee, and reported therefrom, it was in an entirely different shape, and could scarcely be recognized as the same measure, having been changed in title, phraseology, &c. He, therefore, suggested that the bill be simply presented to the Legislature for its action. When this is done, we have done our duty.

Mr. MURDOCH withdrew his amendment, and the President appointed Messrs. Smull, Seiler, and McConkey to take the matter in charge.

Mr. SEILER moved that the same committee be continued, with instructions to make further investigation, and report the same to this society in a practicable shape for action.

Which was agreed to.

WHEREAS, The State Baard of Agriculture recently organized in this Commonwealth, by the collection of statistics and the dissemination of information through its annual reports, promises to become an efficient agent for the promotion of agriculture;

And whereas, It has been the practice, and is the policy and duty of the Pennsylvania State Agricultural Society to encourage and coöperate with every working organization, for the advancement of the farmer calling within the State; therefore, be it

Resolved, That this Executive Committee in furtherance of the object of its appointment, recommend the publication of the report of the State society, and that the officers of the society be requested to urge the publication of our transactions, and to make such arrangements with the State Board of Agriculture as they may deem best to accomplish that object.

Resolved, That a committee of publication be appointed to arrange, under agreement with the State Board of Agriculture, the topics to be considered in the two annual reports aforesaid, and to aid the Secretaries in arranging and compiling the matter belonging to the report of this society.

Which was agreed to.

Committee appointed, consisting of Messrs. Kennedy, Smull, Branson, McConkey, and Seiler.

Mr. BRANSON then discussed the objects of the two organizations in full, and said, in looking over the results in other States, where there were two organizations, as in our State, that he had come to the conclusion that it was only a question of time when one would give way to the other. That he believed the older organization was the stronger, and had been more than twenty-five years at work in educating the farmers as to the best means to improve their stock, seeds, implements, &c. He reiterated his statements of yesterday with details, &c., and said that he doubted if the present method of gathering statistics by the State Board was any better than guess work. That it was not reliable, and would soon be regarded as such.

Mr. SMULL did not desire to discuss the relative merits of either organization. The work of each is wide apart of the other. That there should be no antagonisms; but that both should labor together for the promotion of the interests for which they were created.

Mr. RHEY said that statistics, to be of any value, must be based upon actual facts, and can be obtained only by the way that he suggested at the last meeting, viz: by the law presented by him, and adopted at the last meeting. That as at present reported by the State Board, they are the mere speculation of individuals, loose and unreliable reports. The reports from Washington show how much of a farce they are. Our records go to show what efforts have been made by this Society to enact new and amend old laws to benefit the agricultural interests. The results we all know. Bill after bill for the protection of the farmers have been prepared on all matters of interest. The majority of them have been buried in the committees, to which they were referred by the Speakers.

Mr. HOLSTEIN moved that the March and June meetings be dispensed with, unless called specially by the president.

Mr. EGLE moved to amend, by including that the President should have power to call a meeting or meetings at any time during the current year, if the exigencies of the case should require the same.

Which amendment was accepted, and the resolution, as amended, was agreed to.

Mr. BRANSON offered the following resolution:

WHEREAS, The great duty and responsibility now devolved upon the Secretaries of this society, and their limited means for obtaining a sufficient amount of statistics and on various subjects relating to agriculture for publication in our annual reports; and

Whereas, In order that said report may more fully meet the demands of the public, it is

Resolved, That each member of this Executive Committee be appointed to contribute to its columns such matter as in their judgment will best promote the great interests which we, as a State organization represent, subject, however, to the rejection or approval of the committee appointed to superintend said publication.

Mr. HOLSTEIN offered the following resolution; which was adopted:

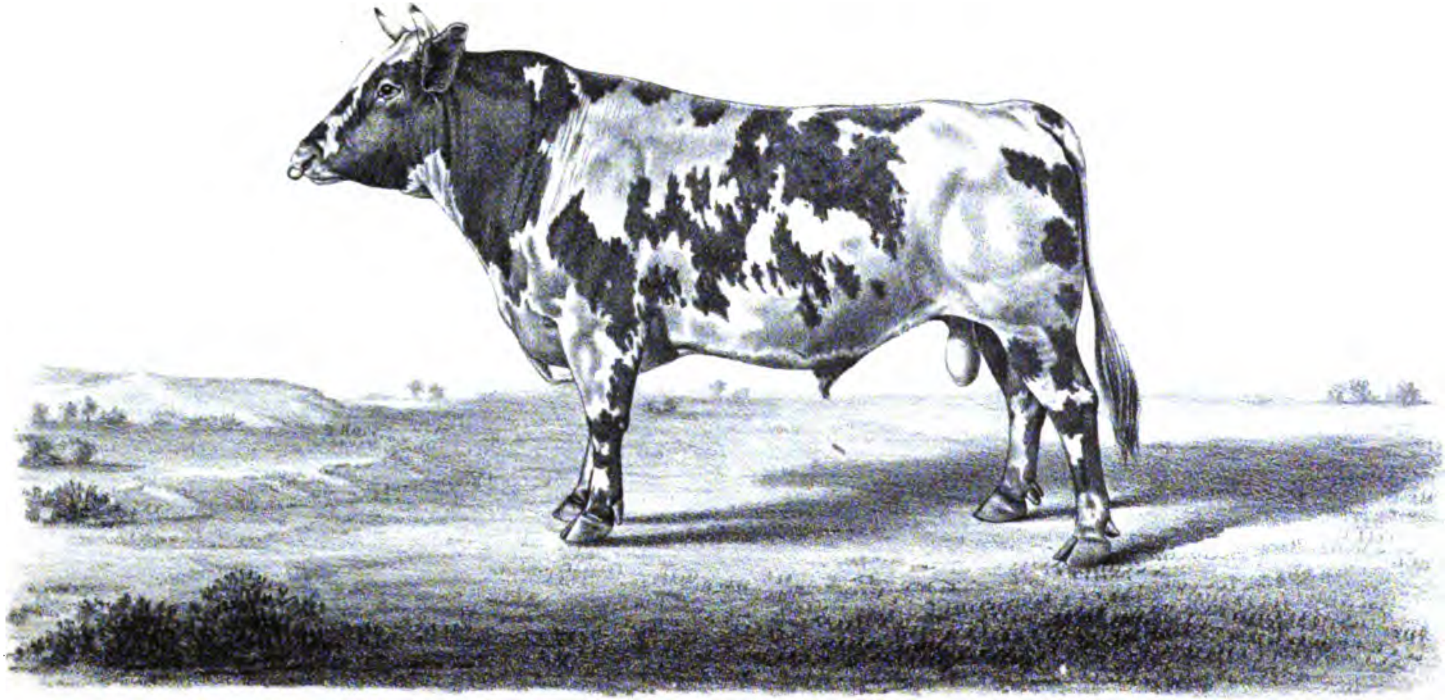
That in consideration of the services rendered by the Recording Secretary to this society during the centennial year,

Resolved, That he be paid the sum of $100 from the treasury of the society.

Mr. KIRKPATRICK moved to amend by striking out one hundred, and inserting two hundred; but Mr. SEILER declining to receive the latter named sum, upon motion of Mr. MILLER, the resolution was agreed to.

Mr. KIRKHATRICK offered the following resolution:

Resolved, That the President appoint a committee of five, (5,) to consist of the President, the two Secretaries, and two members of this Executive Committee, to whom shall be delegated full power to make such changes in the premium lists, location of exhibition, the rules and regulations govern-



PRIZE AYRSHIRE BULL

Photo. from Life by Hovey, Phil^a.

ing the coming exhibition, and to have full authority in all matters relating to this Society, as now given to this Executive Committee.

Mr. HALDEMAN moved to amend, by striking out two, and inserting four.

Mr. SMULL moved to further amend, by striking out five, and inserting seven.

The latter amendment prevailed, and the resolution, as amended, was agreed to.

The President appointed Messrs. Kirkpatrick, Eby, Reed, and Smull on said committee.

Mr. RHEY moved that Messrs. Spencer, Abner Rutherford, and McDowell be appointed a committee to confer with Frank Thompson, Esquire, General Manager of the Pennsylvania Railroad Company, and request him to furnish passes to the officers of this society when traveling on duty.

Which was agreed to.

Mr. SMULL moved that the Recording Secretary be directed to prepare a full account of the proceedings of the Executive Committee, and request the papers throughout the State to publish the same.

Agreed to.

Mr. BRANSON moved that a life membership of the society be voted Townsend Walter, of West Chester, for valuable services rendered by him at different periods.

Upon the suggestion of President HAMMOND and Mr. SEILER, the names of Honorable John Fertig and William A. Baldwin were included in the resolution.

Which was unanimously agreed to.

Mr. KNOX offered the following resolution; which was also agreed to:

That the thanks of the society be tendered to the officers of the railroads centering at Erie for the free transportation granted by them to the officers of the society, and for their many acts of kindness extended to us.

On motion, adjourned.

D. W. SEILER,
Recording Secretary.

PENNSYLVANIA STATE FAIR.

List of Premiums Awarded at Erie, 1878.

CATTLE.

CLASS I.—THOROUGH-BRED HERDS.—*Part 1.*

John C. Morris, vice president, *chairman*, Friendsville; J. S. Keller, vice president, Orwigsburg; George Blight, vice president, Philadelphia; John Hall, Pittsburgh; D. O. Wickham, Titusville; John T. Wilson, Jamestown, New York.

Best Holstein herd, D. D. Tracy, Erie, Pennsylvania,	$40
Best Devon herd, Walter Cole, Batavia, New York,	40
Best Jersey herd, C. B. Moore, Christiana, Pennsylvania,	40
Best Ayrshire herd, A. J. Wilson, Grafton, Ohio,	40
Best Short Horn herd, Charles Lincoln, New Lewisburg, Ohio,	40

THOROUGH-BRED CATTLE.—*Part 2.*

Holstein.

D. D. Tracy, of Erie, bull "Hector," four years old,	$25
Same. Bull "Geneva Duke," two years old,	20
Same. Bull, "Harry," one year old,	15
Same. Bull, "Daisey Duke," one year old,	10
Same. Cow, "Antje," seven years old,	20
Same. Heifer, "Duchess of Erie," three years old,	15
Same. Heifer, "Victorine," two years old,	15
Same. Heifer, "Lady Eva," second, one year old,	15
Same. Heifer, "Jenny G——," one year old,	10
Same. Heifer, "Afra," second, two years old,	10
Same. Heifer calf, "Sarah," two weeks old,	10
Same. Heifer calf, "Pink," one month old,	5
E. E. Chambers, North East, Pennsylvania, bull, "Ajax,"	20

Ayrshire.

E. R. and W. L. Cowden, Harbor Creek, Pennsylvania, bull, "General Brock,"	$25
Same. Cow, "Leila,"	15
William Fairweather, McLane, Pennsylvania, bull, "Sitting Bull,"	20
Same. Cow, "Floss," two years,	15
Same. Cow, "Arlie," one year,	15
Same. Heifer, "Meta," one year,	10
A. J. Wilson, Grafton, Ohio, bull, three years,	20
Same. Bull, one year,	15

Same. Bull calf, under one year,	$10
Same. Cow, three years,	20
Same. Cow, two and three years,	10
Same. Heifer calf,	10
G. W. Crandall, McLane, Pennsylvania, heifer, five months,	5

Devons.

Walter Cole, Batavia, New York, bull "Puritan," second, four years,	$25
Same. Bull, "Puritan Boy," one year,	15
Same. Bull calf,	10
Same. Cow, "Helena," forty-sixth,	20
Same. Heifer, "Lovely," twenty-sixth,	15
Same. Cow, "Puritan Girl," two years,	10
Same. Heifer calf, six months,	5
E. C. Bliss, Westfield, New York, bull "Buckeye," second,	20
Same. Bull, "Shylock."	10
Same. "Lovely," second,	10
Same. Cow, "Nora,"	15
Same. Heifer, "Portia,"	15
Same. Heifer calf, "Satie,"	10
John Welker, Batavia, New York, bull, "Georgiana Puritan," fifth,	15

Jersey.

C. B. Moore, Christiana, Pennsylvania, bull, "Wheatland," third, over three years,	$25
Same. Bull, "Prince of the Herd," one and two years,	15
Same. Cow, "Beauty of Glendale," three years,	15
Same. Cow, "Glendale Belle," three years,	20
Same. Heifer, "Rosalind of Glendale," one and two years,	15
Same. Heifer, "Corrine of Glendale," one and two years,	10
Same. Heifer calf, "Leora,"	10
Peter Runser, Harbor Creek, Pennsylvania, bull, "Prince,"	20

Short Horn.

Charles Lincoln, North Lewisburg, Ohio, bull, three years and over,	$25
Same. Bull, one year and under,	15
Same. Cow, two years and under three years,	20
Same. Cow, three years and under four years,	10
Same. Heifer calf,	10
R. G. Dunn, London, Ohio, cow, four years and over,	20
Same. Cow, one year and under two years,	15
Same. Heifer calf,	5
A. C. Fuller, Levittsburg, Ohio, bull, three years and over,	20
Same. Bull calf,	10
Same. Heifer, one and under two,	10
James Miles, Milesgrove, Pennsylvania, bull, "Morning Star," second,	20
Same. Bull, "Prince Brown,"	10
Same. Heifer, "Nellie Brown,"	10

Working Oxen and Fat Cattle.

E. R. W. L. Cowden, Harbor Creek, Pennsylvania, six heifer calves,	$10
D. D. Tracy, Erie, twenty five head cattle, held and owned as farm stock,	25
Frederick Olds, Summit, Pennsylvania, yoke oxen,	10

Benjamin Tome, Kearsarge, Pennsylvania, yoke oxen,	$5
R. G. Dunn, London, Ohio, fat heifer,	10
H. H. Russell, Belle Valley, Pennsylvania, native heifer,	5
H. Shattuck, Erie, grade short horn calf,	5

The judges in Class I submitted the following report:

Your committee on herds and thorough-bred cattle respectfully report that they found so many exceedingly fine cattle in each herd, that it was very difficult to decide, being obliged to come down to very fine points. We think there has never been shown at one State exhibition so many heads of excellent animals in each herd as there are now on exhibition. Mr. Rundell, of North East, has on exhibition a herd of finely bred short horns, but owing to their being in a very low condition, could not compete with the other herds. Mr. James Miles, of Miles' Grove, also had on exbibition and competition a herd of exceedingly fine and well bred short horns, but kindly withdrew them from competition to act as one of the judges of your committee.

John C. Morris,
D. O. Wickham,
James Miles,
J. C. Thornton,
Committee.

No. 3.—Fine Bred Horses, Mares, and Colts.

J. C. Vanscoter, Erie, Pennsylvania, stallion, "Patrick Machree,"	$50
Same. Stallion, Enfield, junior,	25
R. A. Stratton, Evansburg, Pennsylvania, stallion, "Hull,"	30
M. B. Thayer, Linesville, stallion, "Bigaroon, junior,"	15
A. E. Bliss, Conneaut, Ohio, stallion, Buckeye,	20
A. Whipple, Saegertown, Pennsylvania, stallion, Gettysburg,	15
Thomas Batton, Harbor Creek, stallion, "Claude Kelly,"	10
Israel Thickstone, yearling stallion,	10
E. C. Custard, brood mare, foal at foot,	15
J. H. Welsh, Erie, mare, four years and upward,	15
Albert Erwin, Mosiertown, mare, four years and upward,	10
Same. Mare, three years and under four years,	10
Jesse Ebersole, Harbor Creek, yearling mare,	5
C. G. Dempsey, Spring, Pennsylvania, exhibition of thorough-bred stallions and mares, special premium,	50
S. Short, North East, mare, three years and under four,	15
Same. Stallion, "Trifle," special premium,	"Silver medal."

To S. Short, a special premium of the society medal for his stallion, "Trifle," whose fine form, action, and qualities stamp him a first-class stock horse.

James A. McCrea, *Chairman.*
A. F. Jones,
C. B. Brockway,
S. Dickinson,
William Taylor,
Committee.

No. 5.—Matched Teams.

G. H. Howard, Wattsburg, Pennsylvania, pair coach horses,	$25
T. M. Pendergast, Westfield, New York, pair light harness geldings,	25
C. W. Clark, Wattsburg, Pennsylvania, pair light harness mares,	15
Albert Erwin, Mosiertown, Pennsylvania, pair match gelding, (coach,)	15

Same. Gelding for saddle,	$5
James Janes, Lowville, Pennsylvania, family horse,	10
C. B. Willis, Fairview, Pennsylvania, family mare,	10
George S. Churchill, Erie, mare for saddle,	10
J. C. Vanscoter, Erie, gelding for harness,	5
Patterson & Reeder, Edinboro', mare for harness,	5

No. 6.—STALLIONS AND MARES FOR ALL WORK.

A. Whipple, Saegertown, Pennsylvania, stallion for all work,	$20
F. A. Jacobs, Erie, stallion, Bay George,	15
Mott Sherman, Albion, stallion, one year old,	10
Daniel H. Alder, Concord, stallion, two years and under four,	10
J. W. Thompson, Drake's Mills, stallion, Young Napoleon,	10
J. C. Beard, Waterford, Pennsylvania, stallion, Young Messenger,	10
Martin Hall, Elk Creek, stallion, two years,	5
W. O. Clark, Weslyville, mare, two years, under four,	10
M. Driggs, Erie, mare, five years old,	10
F. B. Willis, Fairview, mare,	5
C. F. Sweet, Edinboro', mare, two years, under four,	5
George Cutter, West Green, mare, one year, under two,	6
Elijah Crow, mare,	15

There was but one entry of imported stallions for all work. Your committee being governed by the premium list, which requires size and action, as well as pedigree, to govern, are of the opinion that he does not merit a first premium, but would recommend a special premium of ten dollars.

TOBIAS BARTO,
GEORGE TABER,
B. F. WEISER,
J. G. KAUFFMAN,
Committee.

No. 7.—JACKS AND MULES.

George Bowman, Spring, pair of mare mules,	$15

No. 8.—FLOCKS AND FLEECES.—*Part 1.*

T. Walter & Son, West Chester, Pa., fleece of Lincoln wool,	$5
Thomas A. Bemus, Ripley, New York, fleece wool from "Buck Climax,"	5
E. Rundell, North East, Spanish Merino ram and five lambs of his get,	10

FINE BRED SHEEP.—*Part 2.*

E. Rundell, North East, pen Spanish Merino ewes,	$5
T. A. Bemus, Ripley, New York, pen Spanish Merino ewes, 3 years,	10
George Cutter, West Green, pen five ewes,	10

Your committee regret to find so few American or Spanish Merino sheep on exhibition. On examination, the covering is found very good; but as to condition of animals for want of more flesh, are of no credit to the exhibitor or the exhibition, and for this reason have omitted making any award to Thomas A. Bemus for his ram "Climax," also to E. Rundell for two rams exhibited by him in a like condition. They would, however, recommend a premium of ten dollars to E. Rundell for five lambs exhibited as the get of his ram.

DAVID H. BRANSON,
JOHN McDOWELL,
J. D. KIRKPATRICK,
Committee.

No. 9.—SWINE.—*Berkshire.*

C. B. Moore, Christiana, Pennsylvania, boar, "Star of Kentucky,"	$10
Same. Boar, "Swanwick Star,"	5
Same. Boar, "Smithereen X,"	5
Same. Sow, "Pride of Glendale,"	10
Same. Five pigs under ten months,	5
F. D. Raymond, Findley Lake, New York, boar between one and two years,	10
T. Walter & Son, West Chester, Pennsylvania, boar ten months old,	3

Chester Whites.

E. B. Ashbridge, East Goshen, Pennsylvania, herd of forty-three head,	$10
Same. Boar, "Jack," two and one half years,	5
Same. Boar, eight months old,	3
Same. Six pigs, fourteen weeks old,	5
T. Walter & Son, West Chester, Pennsylvania, boar, over two years,	10
Same. Boar, Kennett second,	5
Same. Sow, one year and over,	10
Same. Sow, six months, under one year,	5
H. Shattuck & Son, boar, fifteen months,	5

Poland China.

P. M. B. Nicholson, West Mill Creek, Pennsylvania, boar, over one year, under two,	$10
Same. Boar, under ten months,	5

Suffolk.

E. C. Bliss, Westfield, New York, boar, over two years,	$10
Same. Sow, over one year,	10
Same. Five pigs, under six months,	5

Your committee mention a fine display of Victoria or small breed swine, exhibited by E. Rundell, of North East. Their quality was of unusual superiority, and we regret that no provision was made in the schedule for an award to animals of this class. We recommend that the omission be supplied.

ABNER RUTHERFORD,
ISAAC MUMMA,
Committee.

No. 10.—POULTRY.

E. A. Woodbury, Erie, best Plymouth Rocks,	$2
Same. Best White Leghorns,	2
J. A. Webster, Fairview, best Bronze Turkeys,	2
Same. Best pair Rouen Ducks,	2
Frederick Clark, Erie, best Golden Polands,	2
R. M. Bonnel, Wesleyville, best White Ducks,	2
J. Bryant, Erie, exhibition of Pigeons,	1
Frederick Herman, Erie, best Partridge Cochins,	2
John Eaton, Fairview, best Pea Fowls,	2
Same. Best pair Guinea Fowls,	2
Johnston Eaton, Fairview, best Pekin Ducks,	2
C. K. Dickinson, best Cayuga Ducks,	2

D. Mehen, Erie, best Dark Brahmas,	$2
Same. Best Brown Leghorns,	2
Same. Best Black-breasted Red Game Bantams,	2
Albert Cutter, West Greene, best Muscovey Ducks,	2
J. & G. Boyer, best White Cochins,	2
L. A. Burgess, best Buff Cochins,	2

W. P. Atkinson,
W. C. Shurlock,
W. J. Watkins,
Jacob Smith,
Committee.

No. 11.—Plows and Plowing.

We, the committee, make the following report:

After giving Brown's Adjustable Harrow full consideration, we recommend to farmers this harrow, as a No. 1 farm implement.

H. M. Reed & Co.'s display of the different kinds of plows and other farm implements, is a credit to Erie city and to the State, and would recommend them to the consideration of every agriculturist in this State.

Randall's Pulverizing Harrow, in our judgment, is a grand farm implement, and should be in the possession of every farmer in this State, as indispensable, especially to seed sowers. We recommend it to all agriculturists.

The Lawrence & Chapin Diamond Plow is, we consider, one of the leading plows of the day, well adapted to sod as well as stubble ground, and more than meets our sanguine expectations.

We recommend the South Bend Chilled Plow as worthy the consideration of all farmers.

John Dodge,
S. E. Kincaid,
O. F. Dunn,
Dean Hawk,
Committee.

No. 12.—Reaping and Mowing Machines.

D. M. Osborne & Co., Auburn, New York, exhibit single Mower and Reaper and self Binding Harvester. The committee had an opportunity of seeing the binder operate, and it was all that could be desired by the most captious—binding a sheaf from two inches in diameter to eighteen inches, and doing its work perfectly. In their mowers they claim an improvement, inasmuch as the shoe runs directly behind the driving wheel, leaving the driving wheel run on the clear ground and not on the cut grass. They also claim an improvement in their mode of raising the axle, so as to pass over a high obstruction, and a further improvement over ordinary machines in the ease with which they raise the knife to any position while mowing. This was all explained satisfactorily to the committee. On reapers Nos. 3 and 6, they have an adjustable platform, which folds up on going to and from the field, and convenient for housing away in barn or shed. They use, also, a sedge plate in guard.

Warden, Mitchell & Co., of Springfield, Ohio, made a handsome exhibit of the Champion Reapers and Mowers, and especially of the new Champion Mower, all gotten up in the neatest and lightest manner possible, with no part of the machinery that can possibly warp by exposure to the weather. The improvements in the light Champion Mower consist of improved guard, consisting of solid wrought-iron case-hardened guard, improved Pitman rod, consisting of a knuckle joint, fastened with a ratchet nut and spring. This machine has the Torsion carrying cutter bar attached to it, an improvement very simple and light in construction, and which, in the opinion of the committee, ought to be attached to every mower and reaper in use, as it lightens the draft of the machine in relieving the friction of the shoe on the ground at least one hundred pounds. It is so constructed, that it can be taken apart and set up with a monkey wrench alone. Another late and valuable improvement to the reaper, is an attachment to prevent the straw wrapping around the cam.

J. F. Seiberling, of Acron, Ohio, exhibits the Empire Mower. This machine has two sets of teeth in the main spur gearing, thus keeping up a constant and steady motion when in use. They also have an improved guard, with but single bolt, easily detached, to be ground to meet the edge of the knife. The improved combined machine delivers the sheaf from the platform, pressed and ready for binding, without use of reel. The jointed reel rake is used, which can be adjusted so as to be as low as the cutter bar, which, in the opinion of the committee, is an improvement on the ordinary reel.

S. S. Ellis, of Erie, exhibits the New Warrior Mower. The advantages claimed, is rolling wheel for carrying shoe, valuable, though in the opinion of the committee, the Torsion spring attachment is better. Another improvement claimed, is having the guards very close together, there being twenty-two to guard the knife in the machine exhibited. The general appearance of the machine is light and attractive.

He also exhibits a double guard, the only one on the ground. This guard gathers the grain between the guards compactly before the knife reaches it. An improvement in guards, which the committee think will soon come into general use.

Messrs. Altman, Miller & Co., of Ackron, Ohio, exhibit the Buckeye Reaper and Mower.

The late improvements on the Buckeye consist of a jointed reel post, by which the reel is raised and lowered, at the will of the driver, for long or short grain. For the rake, an ingenious device for removing the grain from the table, leaving the bundle with the straw straight and butt square, being what is called a table rake, as distinguished from the reel rakes.

Another late improvement is in the mode of operating the tilting arrangement, throwing the cutter bar, when desired, close to and parallel with the ground.

Messrs. English & Dixon, of New Philadelphia, Ohio, exhibit a combined reaper and mower. The late improvements consist of guard, plated with steel. Tilter at the inside shoe made to adjust itself by driver from his seat. They use fine rakes, which enables them, when desirable, to lay the grain in swath, instead of bundle.

Respectfully submitted,

N. W. RUSSELL,
A. O. HIESTER,
JAMES CHAMBERS,
C. K. RIBLET,
O. M. POTTER,
Committee.

NO. 13.—THRESHING MACHINES AND HORSE POWERS.

While we feel that special mention should be made of the different threshing machines on exhibition, yet, in the judgment of your committee, we think the Aultman Sweepstake preferable for a steam or sweep power machine.

The Heebner & Sons Tread Power and Thresher should be favorably mentioned, and we think has superior claims in its class, and would recommend a silver medal, subject to the decision of the Executive Committee.

M. H. SILVERTHORNE,
G. W. BARR,
Z. L. WEBSTER,
S. C. PHERRIN,
Committee.

No. 14.—CIDER MILLS, CHURNS, AND ARTICLES OF A SIMILAR CHARACTER.

The committee in class No. 14 have examined the various articles entered.

The cider mill, grater, and press exhibited by Boomer & Boschert, of Syracuse, New York, is highly creditable to them, and is recommended to the patronage of the public.

The American hand cider mill, exhibited by John May, is a very useful article of the kind.

The Cooley creamer, exhibited by Whitney & Son, shows a great deal of ingenuity, and may be productive of good results in the dairy products.

The butter worker, exhibited by H. C. Aubury, is a very useful article, and we cheerfully recommend it to the public.

The force pump, exhibited by W. W. Green, speaks of its own merits. and we would recommend it to the public as a pump worthy of patronage.

The two hydraulic rams in operation, exhibited by R. T. Williams, of Erie, (made by Heise & Kauffman, Columbia, Pennsylvania,) worked to the entire satisfaction of the committee, and we would recommend them to the public as simple, cheap, and durable water elevators.

To Messrs. L. W. Olds, George Olds, A. B. Gunnison, and G. W. Low, for their exhibit of pumps, are deserving of special mention.

L. W. Olds had, in our judgment, the largest and greatest variety, well made, and well finished. It was impossible to discriminate between these pumps, as they were all made of good material, and the workmanship could not be excelled.

ELI SLIFER,
N. W. RUSSELL,
W. S. SHATTUCK,
Committee.

No. 15.—CULTIVATORS, GRAIN DRILLS, AND SOWERS.

Your committee would most respectfully report as follows:

The farmers' favorite grain drill, manufactured by Bickford & Hoffman, Macedon, New York, shows superiority of manufacture and finish. Its doubled-force feed, and its fertilizing attachment, which insures perfect work and durability, entitles it to prominent and special mention as a fertilizer drill, being, in our opinion, decidedly superior to any other of this kind on exhibition.

We also find among the plain grain drills the Paxton, made by the Harrisburg Car Manufacturing Company, of Harrisburg, Pennsylvania, a new competitor, whose simplicity of construction, lightness, and ease of operation mark it as worthy of special mention. This drill is furnished with spring tubes, and very decidedly possesses features not shown on any other plain grain drill exhibited, entitling it to the place of honor among this style of drills.

We find the Randall corn harrow, manufactured by the Warrior Mower Company, Little Falls, New York, the most perfect implement of its kind on exhibition. We would emphasize our approval of its merits, believing it to be an invention of superior merit, and would recommend it for a special premium.

D. O. GEHR,
E. M. PEET,
Committee.

CLASS XVI.—WAGONS, CARTS, DRAYS, AND CARRIAGES.

Erie Chair Co., Erie, display of baby carriages and baby chairs, bronze medal.

The committee pronounced the Excelsior Sleeping Coach, made by this company, as the most sensible and satisfactory baby carriage yet introduced to the public. Their baby chairs are also very excellent for the purpose designed.

W. L. Booth, Concord, farm wagon complete. Approved as a useful and convenient farm wagon.

Johnson Eaton, Fairview, garden wheelbarrow, first premium, two dollars.

Erie City Carriage Works, one four-passenger Norwich wagon, diploma.

Same. Three four-bow top phætons, bronze medal.

Same. Display of Watertown platform spring wagons, diploma.

Dudley Torsion Spring Company, Erie, piano box buggy with Torsion springs, bronze medal.

Same. Display of torsion springs, diploma.

Erie Torsion Spring Co., Erie, wagon seat and pole springs, diploma.

H. M. Reed & Co., Erie, display of Cortland platform spring wagons, bronze medal.

Same. Single top phaeton, diploma.

Same. Two-horse family carriage, diploma.

Same. One-horse, (express,) spring wagon, bronze medal.

Same. One-horse farm wagon, complete, diploma.

Same. Display cutters and sleighs, diploma.

Nichols & Son, Corry, sleigh, diploma.

Charles Gallard, Erie, "wagon jack," diploma.

Day, Prushaw & Crane, Fredonia, New York, display of leather-top one-seated phaetons, bronze medal.

Same. Display of platform spring phaetons, diploma.

C. P. Haskins, Erie, buggy and one-horse express spring wagon, bronze medal.

Erie City Carriage Works, single sleigh, diploma.

Same. Improved carriage springs, diploma.

Same. Display spring wagons, diploma.

John M. Glazier, hand-cart, first premium, two dollars.

Fargo & Caughey, Fairview, single top one-seated piano box buggy, diploma.

Same. One farm wagon, diploma.

Gallard & Co., Erie, world's best lock lever wagon jack, diploma.

Moses B. Smith, Jamestown, New York, farm truck, diploma.

W. F. Whitney & Co., Poughkeepsie, New York, side bar springs for carriages, diploma.

M. Harris, Jamestown, New York, farm truck, diploma.

L. W. Olds, Erie, double sleigh, diploma.

W. P. Culver, Scranton, Pennsylvania, carriage thill coupling, diploma.

L. P. Holcomb, Buffalo, New York, lifting jack, diploma.

The committee have made a careful examination of the various exhibits in class No. 16, and the foregoing report of awards made expresses the views of the committee in respect to the same.

IRA TRIPP,
W. W. BOYER,
J. F. DOWNING,
Committee.

CLASS XVII.—MISCELLANEOUS FARM TOOLS.

Gorr, Bass & Co., wire-work, diploma.

John Dodds, self-operator on horse rake, bonze medal.

McCracken, Truesdale & Co., Jamestown, one farm gate, honorable mention.

Harrisburg Car Manufacturing Company, horse rake, honorable mention.

H. M. Reed & Co., set Perkins horse shoes, first premium, two dollars.

Frisbee & Hamilton, Monroe, Michigan, bag holder and truck combined, honorable mention.

C. E. Brinser, Middletown, Pennsylvania, grain cradle, first premium, two dollars.

John Henderson, Albion, New York, American common sense foot form frog supporting horse shoe, diploma recommended.

The Committee on Miscellaneous Farm Tools report as follows:

Ten different kind of horse hay rakes, revolving rakes, were on exhibition, all good and each represented by gentlemen who knew how to show up the points of merit each respectively. Your committee feel safe in saying that any one of these rakes may be used by farmers with profit and satisfaction. After a careful examination of each and their merits, would freely recommend a bronze medal to John Dodds, for No. 39, "Reindeer" self-operating horse rake.

They would also make honorable mention of No. 13, horse hay rake, exhibited by the Harrisburg Car Manufactnring Company, Harrisburg, Pa.

Also of the Taylor and Tiger rakes.

Your committee do unhesitatingly recommend a diploma to John Henderson, of Albion, New York, for the American common sense foot form frog supporting horse shoe.

All of which is respectively submitted.

JOHN MCDOWELL,
DAVID H. BRANSON,
J. D. KIRKPATRICK,
Committee.

CLASS XVIII.—STEAM ENGINES AND CASTINGS.

Ruffner & Dunn, Philadelphia, tube cleaners, first premium, bronze medal.

Jarecki Manufacturing Co., Erie, balance valve engine, first premium, silver medal.

Erie Tile Company, drain tile, second premium, diploma.

G. Westinghouse & Co., Schenectady, New York, agricultural engine, first premium, silver medal.

Thomas G. Morse, Erie, steam jet pump, first premium, silver medal.

C. M. O'Callihan, Erie, Shaw's noise quieting spiral nozzles, first premium, silver medal.

H. M. Reed & Co., Erie., Lester saws, first premium, diploma.

Taper Sleeve Pulley Works, best pulleys, first premium, diploma.

H. M. Reed & Co., Erie, lot of large and small saws, first premium, diploma.

Phœnix Machine Works, Indianapolis, Indiana, portable Muley saw-mill, first premium, silver medal.

Skinner & Wood; Erie, portable engine, first premium, diploma.

George Zeigle, Fairview, drain tile, first premium, diploma.

Thompson Iron Work, Union City, turbine water-wheel, first premium, bronze medal.

C. Aultman & Co., Canton, Ohio, portable steam engine, second premium, bonze medal.

The committee report: The duplicate 9×12 oscillating valve engine manufactured by the Bay State Iron Works, of Erie, although not entered for exhibition, has been used by the society for driving the line of shafting in the machinery building, it has given good satisfaction, and we consider it worthy of notice.

W. B. CULVER,
W. B. BROOKS,
H. W. SPOONER,
Committee.

CLASS XIX.—DISPLAY OF AGRICULTURAL AND OTHER USEFUL ARTICLES AND IMPLEMENTS.

John Mars, Erie, collection of mattresses, diploma.

Riblet Bros, Erie, display of furniture, bonze medal.

P. Minnig, Erie, display of tobaccos, soaps and teas, bronze medal.

C. H. Manly, Erie, display of cigars, diploma.

J. & J. Reynolds, Erie, display of hats, caps, &c., diploma.

H. M. Reed & Co., Erie, display of Middletown silver ware, silver medal.

S. Sobel, Erie, display of laces, foreign and American, silver medal.

W. J. Fitch, Madison, Ohio, ornamental wood work, diploma.

Mrs. G. H. Bull, Erie, display of satins, silks, plush, and velvets, diploma.

H. M. Reed & Co., Erie, display of carriages, Cortland wagons, buggies, cutters, and general display of tradesman's goods, bronze medal.

S. S. Marvin & Co., Pittsburgh, display of crackers and cakes, diploma.

Erie Chair Company, display of children's chairs and baby carriages, diploma.

Evans & Bennett, Erie, display of Price's perfumery, diploma.

C. E. Abbe, Sarasota, Florida, display of shells and natural curiosities from coast of Florida, diploma.

French & McKnight, Erie, display of groceries, diploma.

The displays of millinery by Mrs. G. H. Bull and S. Sobel, were gotten up with exceeding good taste, and while not being confined strictly to millinery goods, comprised so large and elegant an assortment that we award them each the highest primium, viz: a diploma.

H. M. Reed & Co., Erie, display of agriculturul implements, silver medal.

Erie City Carriage Works, display of carriages, buggies, &c., bronze medal.

To the President and Executive Committee of the Pennsylvania State Agricultural Society:

GENTLEMEN: Your committee take great pleasure in mentioning the very large displays of the business men and manufacturers of this section of the country, which are on exhibition at our fair, and call your attention to those made by the following:

Mr. John Mars, of Erie, made a creditable exhibition of matrasses, which are worthy of mention.

Messrs. Riblet Bros., of Erie, presented to the notice of the public, a very fine quality of fine furniture, of a variety of kinds, and are worthy to receive therefor a bronze medal.

Evans & Bennett's display of perfumery was very neat, and are awarded a diploma.

Peter Minning's display of tobacco, cigars, soaps, and teas, was very large and tastefully arranged. The display of Red Tag plug tobacco and Seneca fine cut tobacco was exhibited with much taste, and the quality is excellent. We award him a bronze medal.

Mr. C. E. Abbe, of Sarasota, Manatee county, Florida, exhibited a most interesting display of the products of the gulf coast of Florida, consisting in part of

Chufas.—A valuable substitute for corn. It yields from two to four hundred bushels to the acre, and grows on most any kind of soil. The specimens on exhibition were grown on unfertilized pine and scrub land, and yielded at the rate of two hundred and fifty bushels to the acre. The tops are valuable, also, for fodder, for either horses or cattle, being tender and nutritious, and yields from two to four crops a year. The tuber is also good for man to eat, having somewhat the taste of the cocoanut and the filbert.

Peanut, or Pindare.—Its merits, both as a nut and the tops for animals, are not fully appreciated.

Rice, (upland variety.)—The sample shown was from unfertilized ground, self sown, where oxen had been fed. No difficulty is experienced in raising two crops in a year, and from thirty to fifty bushels to the acre, (in the rough.) The top is a valuable forage, and can be cut from two to four times a year.

Lemons, (Sicily, Messina, and French.)—The Messina lemons, blossoms, and buds were picked from one tree, at the same time. The tree only four years old from the seed.

Guavas.—In liquor and preserved. A number of the samples matured on trees only three years old from the seed.

Figs.—The large white specimens grew on a cutting which, at ten months from the setting, (cutting eight inches high,) matured one hundred and sixty-four figs.

Limes.—Among those exhibited are the nine which grew on the twig four inches in length.

Grape Fruit.—The eight exhibited grew on the stem one foot in length.

Cayenne Pepper.—These were from a plant which had five thousand six hundred peppers on it.

Honey.—The specimens are from the flowers of the saw palmetto.

Pine Apple.—The "sugar" pine. Raised by a lady seventy-four years of age, who was carried on a mattrass to Florida, in 1843, to die. She now cultivates her own garden. She has coffee trees in blossom, three years from the seed.

"Natural history" exhibit embraces alligators, preserved and skins tanned; sting and whip ray, snakes and skins, oils of the alligator, shark, rattlesnake, and sting ray; roseate spoonbills, cowfish, asterias, melitas, sea bears, Indian work, cyprias, pectin odora, voluta junonia, (very rare,) chalcedony, nose jewel of mound builder, bucinum undatum, olivia porphyria, polished woods, alligators' and turtles' eggs, together with a large variety of other articles, curious, useful, or ornamental.

For this very fine display the commitee award him a diploma.

The St. Louis Stamping Company, for their display of granite iron ware, the committee award a diploma.

We award to French & McKnight, of Erie, for their display of groceries, a diploma.

The displays of Mrs. George Bull and S. Sobel, of Erie, were gotten up with exceeding good tase, and, while not being confined strictly to millinery goods, each comprise so large and elegant an assortment, that we award them each the highest premium for such a display, viz: a diploma.

The display of cigars made by C. H. Manley, of his own manufacture, we think entitles him to a diploma.

The display of hats and caps, by J. J. Reynolds, was good, though not large, and we award a diploma.

We award to H. M. Reed & Co., of Erie, for their fine display of silver ware, the premium which the society offers, viz: silver medal.

To W. J. Fitch Madison, for his display of wood turning, a diploma.

To S. S. Marvin & Co., of Pittsburgh, for their display of crackers and cakes, of their own manufacture, and their "pancake flour," a bronze medal.

To the Erie Chair Company, for their display of beautiful and novel baby carriages, a diploma.

The society's premium of a silver medal is richly earned by Messrs. H. M. Reed & Co., of Erie, for their large display of agricultural implements—bronze medal.

The above firm exhibited a fine display of goods, in great variety. Prominent amongst them is a very large collection of carriages, buggies, sleighs, and wagons for road and farm uses, made by the Courtland Wagon Company, of New York, and your committee award them a bronze medal.

The Erie Carriage Works had on exhibition a number of finely finished and beautiful carriages, buggies, and sleighs, and are entitled to a bronze medal.

JOHN A. SMULL, *Chairman.*
GEORGE PEARSON,
J. W. ALLISON,
Committee.

CLASS XX.—MINERALS, METALS, AND FERTILIZERS.

Saltsman & Co., Erie, Buffalo fertilizer, best phosphate on exhibition, diploma.
Same. Rosendale hydraulic cement, diploma.
Same. Display of sewer pipe, diploma.
Wellington Downing, Erie, best collection of mineralogical specimens, first premium, silver medal.
H. L. Berst, artifical mamus, best article of bone dust, diploma.
T. Dwight Ingersoll, Erie, collection of mineralogical specimens, honorable mention.
August Mehler, Erie, best artifical stone, diploma.
C. H. Chapin, Wattsburg, best plow metal, diploma.

W. W. REED,
A. W. HAYS,
JOHN BURTON,
M. H. SILVERTHORN,
WILLIAM HENRY,
Committee.

CLASS XXI.—Leather and its Manufactures.

A. B. Tracy, Mayville, New York, check supports, diploma.	
J. Boland, Conneautville, Pennsylvania, three sides harness leather, second premium,	$2
Same. Three sides upper leather, first premium,	5
Same. Six calf skins, first premium,	5
H. M. Reed & Co., carriage whips, diploma.	
J. Rife & Brother, Middletown, Peensylvania, six sides long harness leather, first premium, diploma.	

Respectfully submitted,

J. Eichenbauh, junior,
W. H. Mantague,
Committee.

CLASS XXII.—Butter, Cheese, and Honey.

H. Williams, Woodcock borough, cheese, first premium,	$20
John Fuller, Harmonsburg, Pennsylvania, three cheese, second premium,	15
George F. Webb, Rundletown, Pennsylvania, three cheese, third premium,	10

Sweepstakes Cheese.

John Cole, Venango borough, Pennsylvania, first premium,	$20
Excelsior cheese factory, Erie, second premium,	10
J. McGownell, Waterford, best ten pounds honey,	5
D. Videto, North East, second best ten pounds honey,	3
Henry Kridder, Fairview, best five pounds honey,	3
D. Videto, North East, best bee hive,	2
Mrs. John Burton, Erie, best three rolls of butter,	5
Lyman A. Burgess, North East, second best three crocks butter,	3
D. Videto, excelsior honey extractor, first premium,	Diploma.

Your committee having carefully examined the above lots of cheese, find all of superior excellence, and the lots deserving of special notice, being nearly alike in quality, do recommend that the premiums be awarded,

First, to John Cole, exhibit No. 1,	$20
Second, to Excelsior factory, exhibit No. 2,	10

In the exhibit of butter, make the above awards, and think the single roll of three pounds, entered by Miss Mary Read, fine, and worthy of a premium.

The bee hive exhibited by J. McGownell, is, in our opinion, worthy of a diploma.

The honey extractors exhibited by D. Videto, of North East, are well adapted for the use intended, in every respect, and worthy of a diploma.

We also find Bingham's bee smoker, exhibited by the same party, very simple in its construction, and a useful invention. Also recommend a premium for the same.

Respectfully,

J. R. Eby,
L. C. Magaw
M. H. Terry,
J. M. Bigger,
Committee.

CLASS XXIII.—FLOUR AND INDIAN MEAL.

To the President and Members of the Executive Committee:

GENTLEMEN: Your committee, examining the entries in this class, report that the exhibit made by J. B. Crouch & Co., of Erie, unfortunately there being no competition, the committee, after a thorough examination, do not feel warranted in making any award.

D. SHELLY,
J. D. KIRKPATRICK,
Committee.

CLASS XXIV.—GRAINS AND SEEDS.

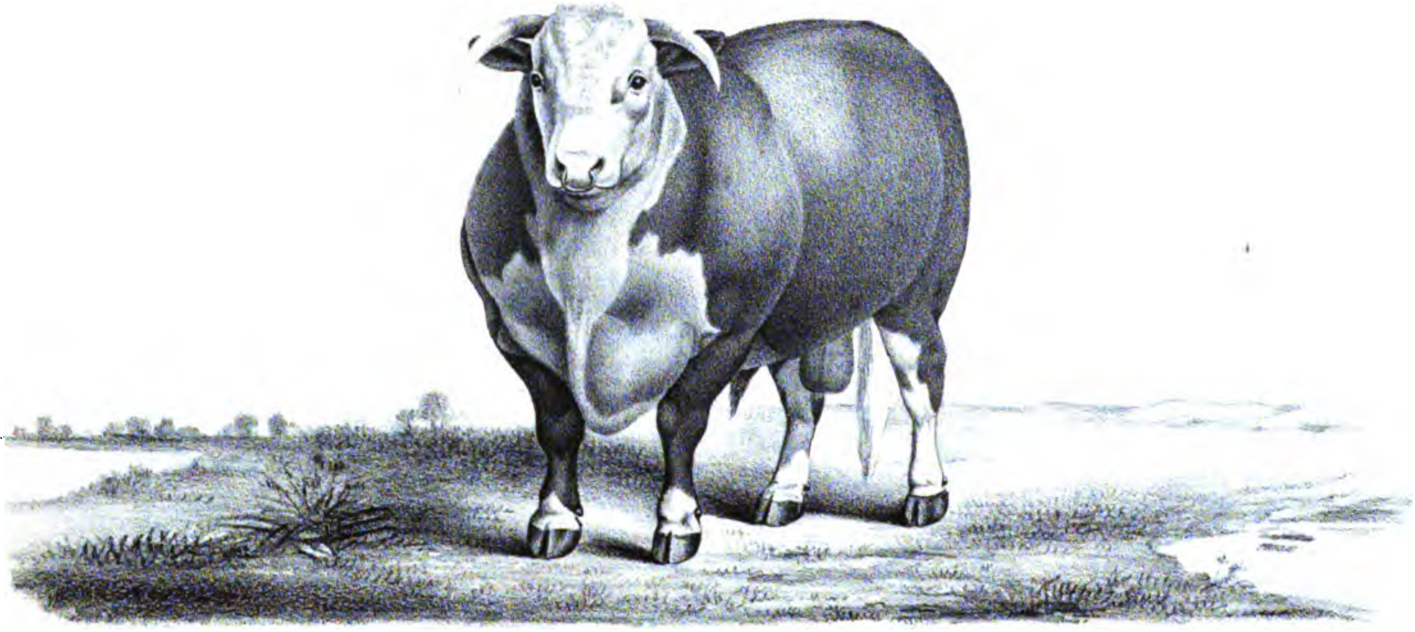
W. W. Reed, Erie, one bushel bag Lancaster red wheat, first premium,	$5
Frank Vogt, Eric, samples of hops, first premium,	2
A. J. Ebersole, Harbor Creek, one bushel timothy seed, first premium,	2
H. H. Russell, Belle Valley, Pennsylvania, one bushel white wheat, first premium,	3
J. W. McDowell, Dicksonburg, Crawford county, Pennsylvania, best and largest variety of wheat, not less than one half bushel each, first premium,	5
Same. Bushel of oats, first premium,	2
Same. Bushel of barley, first premium,	2
Same. Bushel of buckwheat, first premium,	2
Same. Best and largest display of grain, not less than six varieties, first premium,	10
Same. One half peck pea seed, first premium,	2
Same. Sample of newly introduced grain, first premium,	2
D. Videto, North East, Pennsylvania, bushel of clover seed, first premium,	5
H. Shattuck & Son, Erie, bushel of yellow corn, first premium,	2
John Stranahan, Harborcreek, bushel of potatoes, (Early Rose,) first premium,	2
J. F. Caughey, Erie, bushel of rye, first premium,	3
Michael Eckendorf, Wesleyville, one peck pea seed, first premium,	2
Same. One half peck parsnip seed, first premium,	2
Same. Bushel white flint corn, first premium,	2
James Hallenan, Erie, quart of onion seed, first premium,	2
Same. One half peck cucumber seed, first premium,	2
W. W. Eaton, Fairview, one half bushel sweet potatoes, first premium,	2
J. R. Rife, West Fairview, Pennsylvania, one half bushel seedling potatoes, two years, first premium,	2
James Hallenan, Erie, one half peck sugar beet seed,	2
J. R. Rife, Fairview, seven variety seedling potatoes, one half peck of each, first premium,	5

We, the members of the committee, submit the above as our report.

GEORGE RHEY,
DAVID H. BRANSON.

CLASS XXV.—COLLECTION OF AGRICULTURAL PRODUCTS.

T. Sprague, North East, best collection exhibited by a union of six different persons, T. Sprague, H. Churchill, J. H. Reed, James Reed, Joel Reed, H. T. Sprague,	$10
J. W. McDowell, Dicksonburg, six bushel rye, first premium,	10
Same. Six bushel oats, first premium,	6



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Owned by John Merryman, *Baltimore Co. Md.*

First Premium at York County Fair.

Same. Two bushel timothy seed, first premium,	$10
Same. Exhibit composed of all or any of foregoing grain seeds, &c., first premium,	10
D. Videto, two bushel clover seed, first premium,	10
H. T. Sprague, collection of peas, first premium,	10
Six Cumberland county farmers, six bushel potatoes, first premium,	8

Your committee beg leave to report a very creditable display of the foregoing, and make the above award.

Respectfully,

J. D. Kirkpatrick,
David H. Branson,
Albert Price.

CLASS XXVI.—Beet and Sorghum Sugar Machinery.

No entries.

CLASS XXVII.—Vegetables.

W. W. Eaton, Fairview, twelve ears white corn, first premium,	$1
A. W. Roberts, Concord, Pennsylvania, three Maur squashes, first premium,	1
Same. Twelve red onions, first premium,	1
Same. Twelve carrots, first premium,	1
Same. Twelve parsnips, first premium,	1
Henry Neimeyer, second best display of vegetables, thirty varieties,	5
Artemas Martin, twelve peppers, first premium,	1
William Moorhead, Moorheadville, three watermelons, first premium,	1
Same. Three green fleshed nutmegs, first premium,	1
Same. Three yellow fleshed nutmegs, first premium,	1
H. Shattuck & Son, twelve beets, first premium,	1
Same. Six mangell Wurtzells, first premium,	1
Charles Gallard, Erie, six stalks rhubarb, first premium,	1
H. J. Thurber, Erie, Hubbard squash and vine, first premium,	2
James Hallenan, Erie, best display vegetables,	10

Your committee, after a careful examination of the limited but fine display in this department, respectfully report the foregoing as their awards.

Respectfully submitted,

W. S. Bissell,
John Burton,
J. M. Bryant,
Committee.

CLASS XXVIII.—Cordials, Cider, &c.

William Fairweather, McLean, Pennsylvania, three bottles of cider, first premium,	$3
George Doll, West Mill Creek, two gallons cider vinegar, first premium,	3
C. F. Sweet, Edinboro, one gallon blackberry wine, first premium,	2
Mrs. Isaac Wolf, home-made currant wine, first premium,	2
S. M. Hertzler, Cumberland county, Concord wine, first premium,	3
Same. Delaware wine, first premium,	3
Same. Isabella wine, first premium,	3

To the Honorable John W. Hammond, *President:*

The undersigned committee on wines, cordials, &c., beg leave to report that having carefully examined the exhibits of vinegar submitted to us, we recommend a premium of three dollars to George Doll for best article. Five of the samples of vinegar presented were so nearly alike in excellence, that we found it difficult to decide between them. We therefore recommend that a premium, in the discretion of the society, be paid to John Eaton, Fargo & Caughey, Mrs. Isaac Wolf, and H. Shattuck & Son for meritorious exhibits. We recommend premiums in wines and cordial as inserted opposite names of exhibitors. There being no premium for whisky or brandy, we have awarded none, but we mention, with decided approval, the exhibit of old rye whisky, peach brandy, apple brandy, and grape brandy, exhibited by S. M. Hertzler, of Cumberland county, Pennsylvania, and deem them worthy of either premium or diploma. All of which is respectfully submitted.

JOHN P. VINCENT, *Chairman pro tem*,
W. W. BOYER,
HENRY SOUTHER,
DR. WILKINS,

CLASS XXIX.—FRUITS.

Albert Russell, Belle Valley, three varieties fall pears, first premium,	$3
Same. Two branches plums in alcohol,	honorable mention.
W. W. Eaton, Fairview, six varieties grapes, first premium,	5
Same. Concord grapes,	honorable mention.
Same. Sample of grape training, first premium,	5
Same. Grapes grown in cold vinery, first premium,	3
P. Osborne, Girard, five varieties winter apples, first premium,	5
Jessie Jones, Erie, ten varieties fall apples, first premium,	6
George Doll, West Millcreek, twelve prunes,	2
R. M. Bonnell, Wesleyville, ten varieties fall apples, second premium,	3
H. T. Sprague, Erie, five varieties winter and fall pears, first premium,	4
Same. Three varieties same, second premium,	2
Mrs. C. P. Sprague, Erie, arranged basket pears, first premium	6
C. A. Leet, Moorheadville, arranged basket quinces, first premium,	5
Same. Fifteen bunches grapes, first premium,	10
Same. Catawba grapes,	honorable mention.
Same. Delaware grapes, four bunches, first premium,	1
Same. One half peck any variety, first premium,	2
E. F. Moorhead, Moorheadville, five varieties winter apples, second premium,	2
John Finch, one half peck Delaware grapes, first premium,	2
J. J. Ebersole, Harbor Creek, largest collection apples, second premium,	5
J. H. Lyon, Willoughby, Ohio, one half peck Isabella grapes, first premium,	2
Same. One half peck Concord grapes, first premium,	2
Same. One half peck Catawba grapes, first premium,	2
Same. Four bunches Isabella grapes, first premium,	1
Same. Four bunches Concord grapes, first premium,	1
Same. Four bunches Catawba grapes, first premium,	1
Same. Six varieties peaches, first premium,	4
Same. Largest collection peaches, first premium,	Diploma.
Same. Three varieties peaches, second premium,	2
M. Mehl, Erie, three varieties summer pears, first premium,	2
Same. One half peck Diana grapes, first premium,	1
Same. One half peck Rebecca grapes, first premium,	2
Same. Twelve gages, first premium,	3

T. S. Hubbard, Fredonia, New York, two bunches grapes, new hardy kind, first premium,	$2
James A. Nelson, Indian Run, best collection apples,	10
Same. Ten varieties fall apples, first premium,	5
Same. Ten varieties peaches, first premium,	3
Same. Best arranged basket peaches,	5
Same. General assortment fruit all kinds, second premium,	10
American Drier Company, Chambersburg, evaporated and conserved fruits, berries, and vegetables, first premium,	3
C. A. Leet, Moorheadville, largest and best variety grapes,	Diploma.

After a careful and thorough examination, your committee on fruits report, and make the above awards. The display in this department is not as large as in former years, although there are some very fine specimens of grapes. Apples, peaches, plums, quinces, &c. are only ordinary. A few of the peaches entered are fair, but not up to the standard. This department contains one hundred and twenty seven entries, but not all on exhibition. James A. Nelson, of Indian Run, Mercer county, Pennsylvania, makes a fine display of apples—one hundred and fifty varieties. J. J. Ebersole, Harbor Creek, twenty-nine varieties. T. Sprague, North East, twenty varieties. In grapes, the display is very fine and excellent in quality. The collection of J. H. Tryon is not as large as some others, but superior in quality. C. A. Leet's collection is large, varied, and excellent. No premium is offered for Salem, Martha, Diana, Rebecca, Wilder, and other varieties entered by Mr. Leet, but we certainly consider his collection worthy of any remuneration you may deem best. In view of the above facts, Johnson Eaton, W. W. Eaton, C. Leet, and M. Mehl, make creditable displays in this department. We would make honorable mention of W. W. Eaton's Concord, and C. A. Leet's Catawba grapes.

The Catawbas entered by J. H. Tryon, were not only fine, but thoroughly ripe.

The Prentiss, entered by T. S. Hubbard, Fredonia, New York, is a new, hardy variety, which ripens early, with the Concord, and appears not only hardy but healthy.

The orange plant entered by Berst Bros., is very handsome.

Albert Russell's plums on branches, in alcohol, is a new departure.

We would make honorable mention of J. A. Nelson's twenty varieties evergreens, and his five varieties of winter apples.

The best arranged basket of apples, entered by Jessie Jones, not only deserves the first premium, but is worthy of special note.

The portable fruit dryer, exhibited by the American Drier Company, of Chambersburg, Pa., seems to do its work admirably, and can be recommended for its cleanliness, economy, and adaptation for its peculiar work.

L. A. Mackey, *Chairman*,
John F. Miles,
S. B. Griffith,
G. L. Brandon,
Andrew Robinson,
J. B. G. Kinsloe.

CLASS XXX.—Flowers and Designs.

Berst Bros., Erie, best twelve varieties, plants and flowers, first premium,	$4
Same. Best six varieties, plants and flowers,	3
Same. Second best collection leaf plants,	3

Same. Best collection geraniums,	$2
Same. Best collection tuberoses,	2
Same. Best collection cut roses,	2
Same. Second best pair round bouquets,	2
Same. Second best pair flat bouquets,	2
Same. Second best basket with flowers,	2
Same. Second best fancy basket with flowers,	1
H. S. Sprague, Erie, second best display of evergreens,	5
H. A. Neimeyer, Erie, second best twelve varieties, one each, flowers,	3
Same. Second best six varieties flowers,	2
Same. New specimen plant, not before shown.	
Same. Best collection of leaf plants,	5
Same. Bedding and out-door decoration for garden,	5
Same. Best collection of pinks,	2
Same. Best collection of pansies,	2
Same. Best collection of gladiolas,	2
Same. Best collection of fuchsias,	2
Same. Best collection of heliotropes,	2
Same. Best collection of dahlias,	2
Same. Best collection of petunias,	2
Same. Best collection of asters,	2
Same. Best collection of aloes and cactus,	2
Same. Best pair of round and hand bouquets,	3
Same. Best flat and round hand bouquets,	3
Same. Best round bridal bouquets,	3
Same. Best collection bouquets, pyramid form,	5
Same. Best basket with flowers,	2
Same. Best fancy basket with flowers,	2
Carr Bros., Erie, nursery collection, first premium,	10
James A. Nelson, Indian Run, Pa., display of evergreens, twenty-five kinds,	10
Berst Bros., new specimen flower, not before shown,	2

We, the members of the committee, respectfully present the above as our report.

JOHN MURDOCH, jr., *Chairman*,
MRS. C. M. REED,
MRS. J. M. KIMBALL,
MRS. GROVE H. JOHNSON,
MRS. STUERZNICKLE,
F. M. EBY,
Committee.

CLASS XXXI.—STOVES AND TINWARE.

Chicago and Erie Stove Company, display of stoves and portable ranges, silver medal.

C. Flickinger, Erie, display of heating stoves, complimentary mention.

H. M. Reed & Co., display parlor heating stoves, honorable mention, and diploma recommended.

In forming their judgment in class No. XXXI., your committee have been guided strictly by the terms under the heading as the published catalogue. Considering the question of best display to involve the points of quality, style, variety, and number, and without attempting to decide fine points, on which there may be differences of opinion only to be settled by experiment, they award to the Chicago and Erie Stove Company the silver medal, for best display of stoves, ranges &c.; the premium of two dollars, for best portable range, and the premium of two dollars for only display of hollow ware.

While making this award, and expressing their gratification at the interest shown by this company in making their exhibit, they desire to suggest a diploma to H. M. Reed & Co., for a large display of heating stoves, especially of that known as the St. James, and the handsome style of the same.

Mr. C. Flickinger they desire to compliment on his exhibit of one style of coal and one style of wood heater.

J. D. Kirkpatrick, *Chairman*.
C. H. Cushman,
H. D. Jones,
Committee.

CLASS XXXII.—Glass, Cutlery, Lamps, &c.

Troop & Son, Harbor Creek, Pennsylvania, half dozen elm bushel baskets, first premium,	$1
Riblet Bros., Erie, bedstead, first premium,	2
Same. Bed and bedstead, first premium.	5
F. F. Adams & Co., Keystone washing machine, first premium,	1
Same. Keystone clothes wringer, first premium,	1
Mount Vernon Lantern Works, Mount Vernon, Ohio, display of lamps and lanterns,	Bronze medal.
Erie Washer Company, Walker washer,	Favorable mention.
Union Manufacturing Company, Erie, Union noiseless spring bed, first premium,	1
William E. Hulett, Unionville, Ohio, flour barrel, first premium,	1
M. N. Lovell, Erie, Lovell family washer,	Favorable mention.

After a careful examination of the above various articles, your committee submit the above as our report. All of which is respectfully submitted.

H. L. Wilkins,
J. M. Bryant,
D. T. Jones,
Committee.

CLASS XXXIII.—Cloths, Linens, Blankets, Shirtings, &c.

J. W. McDowell, Dicksonburg, ten yards linen diaper,	Diploma.
Same. Linen shirting, first premium,	$3
Same. Plain flannel.	Diploma.
Mrs. F. W. Koehler, Erie, rag carpet, first premium,	3
O. R. Sly, pair home-made woolen socks,	Diploma.
Same. Pair home-made cotton socks,	Diploma.

Your committee have found the exhibits in this department extremely meager, and in quality generally not above mediocrity.

D. J. Waller,
Henan James,
Committee.

CLASS XXXIV.—Quilting, Needlework, Embroidery, &c.

Mrs. P. Arbuckle, Erie, one picture, bead-work, first premium,	$1
Miss Agnes Sterrett, Erie, display of needle-work, first premium,	3
Miss Mason, Erie, one toilet set, first premium,	2

Same. Embroidered bracket, first premium,	$1
Inez Olds, Erie, lace handkerchief, hand-made, first premium,	1
Mrs. D. O. Nason, North East, point lace barbs, first premium,	2
Miss Mary Bloeser, Erie, needle-work picture, first premium,	1
Mrs. H. Keene, Erie, display of bead-work, first premium,	2
Mrs. H. Webster, Titusville, bead pin-cushion,	1
Miss C. M. Zimmerman, Erie, display of handkerchiefs, first premium,	3
Mrs. T. H. Quigley, Erie, embroidered skirt,	1
Rosine Walda, Erie, basket quilt, first premium,	1
Mrs. A. M. Compton, white quilt, first premium,	2
Mrs. J. R. Saltsman, Erie, three silk bed quilts, first premium,	3
Same. Two table covers on cloth, first premium,	2
Miss Hattie Barr, calico bed spread, first premium,	1
E. E. Custard, sofa pillow, first premium,	1
Same. Silk embroidery,	1
Mrs. P. D. Falkner, Erie, pair of slippers, first premium,	2
Miss S. E. Kilbourne, Honiton lace handkerchief,	1
Same. Point lace handkerchief,	1
Miss Lizzie Johnson, Erie, embroidered towel, first premium,	1
Same. Night gown, (bobinet work,) first premium,	1
Mrs. Lebling, Erie, embroidered collar, first premium,	1
Marion P. Booth, Erie, bracket lambrequin, first premium,	1
Mrs. J. Abell, Erie, embroidered pin-cushion and watch case,	1
Same. Child's dress, first premium,	3
Mrs. Ross Weaver, Erie, log-cabin quilt, first premium,	2
Miss Annie L. Wilson, Edinboro, blocks of patch-work, first premium,	1
Mrs. B. F. Sloan, Erie, embroidered sewing chair, first premium,	1
Mrs. Thomas McKee, pillow shams,	1
Mrs. Thomas McConkey, Frie, embroidered foot-rest,	1

We, the undersigned committee, after making a careful examination of the various articles on exhibition, in class No. 34, have made the foregoing awards of premiums.

Your committee regret that by adhering strictly to the printed schedule, they could not award premiums to all they believe deserving of them.

W. H. HOLSTEIN, *Chairman*,
MARY J. PAULI,
ELLEN R. WALTER,
Mrs. H. W. VANSCOTER,
Mrs. J. R. SALTSMAN,
Committee.

CLASS XXXV.—KNITTING, CROCHET, SKILE WORK.

Miss H. H. Marsh, E. Springfield, one hair wreath, first premium,	$2
Same. One zephyr toilet cushion and watch case, first premium,	1
Mrs. James Curry, Erie, one wax cross, first premium,	1
L. J. Barr, Erie, four moss pictures, first premium,	2
Mrs. W. J. Scott, Mill Village, crochet tidy, first premium,	1
Same. Collar tatting, first premium,	1
Mrs. E. D. Carter, Erie, knitted shawl, second premium,	1
Mrs. E. Mayfield, Erie, crochet shawl, shell stitch, first premium,	2
Miss Mason, Erie, crochet scrap bag, first premium,	1
Miss Blanche Tanner, Erie, four crochet tidies, first premium,	2
Miss Inez Olds, Erie, knitted shawl, first premium,	2

Mrs. Orvill Johnson, Erie, crochet basket, first premium,	$1
Mrs. Clara Barnes, Findley's Lake, N. Y., hair work, second premium,	1
Same. Gent's knit scarf, first premium,	1
Miss Orenda Jane Martin, Erie, fancy basket of everlasting flowers, first premium,	1
Miss Lillie E. French, North East, cross on perforated card board, first premium,	1
Mrs. William C. Keeler, knit spread, (white,) first premium,	2
Mrs. G. S. Warren, Erie, knit bed spread, second premium,	1
Mrs. John Fisher, Erie, knit black silk lace, first premium,	1
Same. Three handkerchiefs, first premium,	1
Miss Rose Whitney, Erie, thread tidy, first premium,	1
Mrs. Titus F. Berst, Erie, zephyr, first premium,	1
Mrs. T. Hallowfield, Erie, zephyr flowers, first premium,	2
Miss C. M. Zimmerman, Erie, knitted shawl, first premium,	2
Miss Anna Zeller, Lock Haven, lace embroidered tatting, first premium,	2
Miss L. H. Skinner, Erie, knitted crib spread, first premium,	1
Same. Crochet collar, first premium,	1
Mrs. J. Abell, Erie, chair tidy and arms, first premium,	1
Mr. P. D. Faulkner, Erie, afghan, (crochet and embroidered,) second premium,	1
Mrs. A. T. Loomis, Erie, afghan, first premium,	2
Mrs. G. H. Bull, Erie, artificial flowers,	2
Mrs. Dr. Ingersoll, Erie, wax work, first premium,	2
Mrs. H. Keene, Erie, moss pictures, first premium,	2
Mrs. Thomas McConkey, Erie, knitted sontag, first premium,	1
Same. Knitted slipper, first premium,	1
Same. Crochet hood, first premium,	1
C. H. Austin, two vases ornamental grasses, first premium,	1
Miss Susan Myers, deaf mute, tidy, first premium,	1

Respectfully recommend the above awards.

Mrs. W. S. Brown,
Mrs. H. C. Shannon,
Mrs. Thomas McConkey,
Mrs. C. H. Taylor,
Committee,

CLASS XXXVI.—Bread, Cakes, Pastries, and Meats.

Martin Mauer, Erie, five varieties of bread, first premium,	$2
Same. Two loaves home-made bread, first premium,	2
Same. Best and largest display of bread,	2
Miss Tillie Winkle, rusk, first premium,	1
Mrs. Thomas McConkey, Erie, cup cake, first premium,	1
Mart. Mauer, Erie, fruit cake, first premium,	1
Same. Gold cake, first premium,	1
Same. Sponge cake, first premium,	1
Same. Lady cake, first premium,	1
Same. Silver cake, first premium,	1
S. S. Marvin & Co., Pittsbnrgh, best variety of small cake,	1
Mart. Mauer, Erie, best display of cakes,	2
Same. Best display of assorted candies and confections,	5

We would make special mention of the pancake flour exhibited by S. S. Marvin & Co., of Pittsburgh.

The foregoing is respectfully submitted by the judges.

Mrs. J. J. WADSWORTH,
Mrs. J. M. BRYANT,
Mrs. S. E. TEEL,
Mrs. G. V. MAUS,
Mrs. M. SANFORD,
Miss FANNY GEHR.

CLASS XXXVII.—PRESERVES AND SPICED PRODUCTS.

Mrs. D. Hawk, Erie, best two jars of peaches,	$1
Mrs. H. S. Jones, Erie, second best display of pickles, in ten jars,	3
George Doll, West Millcreek, best one gallon apple butter,	1
Miss E. C. Eaton, Fairview, best two jars quince jelly,	1
Miss Fannie Reed, Erie, best two jars pickled cucumbers,	1
Mrs. L. W. Olds, Erie, best two cans air tight peaches,	1
Mrs. H. L. Berst, Erie, best display of pickles, ten jars,	5
Mrs. C. H. Austin, Erie, best two jars of pears,	1
Same. Best two jars strawberries,	1
Mrs. Hobart Hogan, Erie, second best display preserves and jellies,	3
Mrs. J. W. Shenk, Millcreek, best three jars preserved peaches,	1
Mrs. John Abell, Erie, best display of preserves and jellies,	5
Mrs. E. W. Reed, best two jars spiced peaches,	1

Respectfully submitted,

Miss SARAH A. REED,
Mrs. J. H. NEILL,
Mrs. F. F. ADAMS,
BELLE WINCHELL.

CLASS XXXVIII.—FINE ARTS AND PENMANSHIP.

Paul Kreutzpointner, Erie, five specimens industrial drawing, first premium,	$3
Lester J. Barr, specimen penmanship, map of farm survey, first premium,	2
Miss Augusta Densmore, McLane, display of water colors, first premium,	3
Same. Flowers in water colors, first premium,	3
Miss Josephine Swan, Swanville, pen and ink sketch, second premium,	1
W. A. Morand, Erie, best display in plain and colored photographs, bronze medal.	
Same. Portraits in crayon, first premium,	3
Miss Anna L. Zimmerly, Erie, water color landscape, first premium,	3
Same. Animal painting in oil, first premium,	3
E. H. Caughey, Erie, two portraits, first premium,	3
Frank Fairbairn, Erie, specimen of crayon, first premium,	3
Miss Carrie Halcott, Erie, display of mono-chromatic drawing, first premium,	3
Miss Josephine Swan, Swanville, Pennsylvania, landscape painting in oil, first premium,	3

HENRY SOUTHER, *Chairman*,
GEORGE W. HAYWARD,
E. WHITTELSEY,
F. B. BREWER, junior,
Mrs. L. A. MORRISON,
Mrs. J. W. REYNOLDS.

CLASS XXXIX.—Silverware, Pianos, Sewing Machines.

R. M. Wanzer, Buffalo, New York, best double stitch sewing machine.
Burdett Organ Company, Erie, best church and parlor organ.

George F. Brierly,
Mrs. William B. Frank,
Belle Winchell,
David H. Branson,
Committee.

CLASS XL.

Erie, *September 25, 1878.*

To the Executive Committee Pennsylvania State Agricultural Society:

Gentlemen: Your committee on miscellaneous entries present the following report:

There were sixty-seven entries, some of which, however, were improperly classified, but as the other committees were at their labors, we made the proper examination and award. All articles of machinery should be entered in the special class designated therefor, and articles entered to make up displays, should not be entered separately. As several of the articles at former exhibitions had received the highest premium this society can bestow, the committtee have felt it their duty to simply make honorable mention. Had there been a competitive display, it would have been different. Another thing, since the inventive genius of Americans know no bonnds, there are very many ingenious devices for facilitating labor which are deserving of honorable mention, where the owners or manufacturers expect a diploma or a bronze medal, or even money award. Of course, the latter has never been given, while the former, diploma or bronze medal, has been only given to such works or articles as possess not only ingenuity, but merit and great usefulness. In consonance with these views, your committee take great pleasure in recommending the following:

Honorable Mention.

To Ross R. Royer, West Mill Creek, for case of insects. Henry H. Colberg, of Erie, for flower pots, prepared by patent process in all colors. H. K. & F. B. Thurber, of New York, for Higgin's Eureka salt for dairy purposes. P. S. Ensworth, of Waterford, an ingenious contrivance for showing advertisements. Charles Gallard, of Erie, for manner of putting up post rail fence. P. G. Winkler, of Erie, piano model, and to the same person, a slate and boy for ciphering. W. H. Servell, of Erie, for fire kindler. G. R. Knight, of Erie, a painter's cart, convenient and useful. Gustav Boyer, of Erie, a model marine engine. W. L. Conrad, of Westfield, New York, specimen of sign painting, admirably executed. George E. Doolittle & Co., of Erie, automatic dress plaiter, and also patent wire binding. L. W. Olds, Erie, for bear-skin robe. S. Soble, of Erie, exhibition of a carpet.

Diplomas.

To A. O. Coryell, of Brockton, New York, for picket fence, entered as portable. Lee's Patent Metallic Bill File Company, for metallic bill file or document holder, invaluable to lawyers and others. W. C. Olds, of Erie, for Eureka sap spiles and sap-bucket and cover. John Hafer, of

Bedford, Pennsylvania, for portable fence entitled the Granger fence; cheaply made and easily put up. D. O. Nason, of North East, for carpet sweeper. A. Achison, of Erie, for model of a new device for warming houses by a combination of heated air and steam. Union Manufacturing Company of Erie, for Folding Sewing Table. Mrs. E. A. Dumars, for Lincoln's patent fringing machine, and for Victoria plaiter, each. Miller & Mire, of Duke Centre, for self-measuring funnel. G. D. Devitt, of Jamestown, Pennsylvania, for revolving farmgate. Reed & Watt, of North East, for extension tables.

Bronze Medals.

To Messrs. Coates & Cleveland, of Erie, for Little Giant Water Moter, for excellence and simplicity of construction.

To the American Fusee Company, of Erie, for display of safety and sanitive matches, the committee would cheerfully award a bronze medal; but aware of the fact that such award was made last year, the committee believe that special commendation of these everyday articles used in our homes would be a higher award, the committee unhesitatingly recommend these matches as being all that is claimed for them—safe and sanitive.

To F. F. Adams & Co., of Erie, for their manufacture of a number of valuable and useful inventions, viz: complete clothes wringer, step and extension ladders, Excelsor and reversible clothes horse, hard-wood wainscoating, bed springs, novelty brush-holders, and hat and coat racks, we award *a bronze medal.*

To T. Hallonfield, of Erie, for fine display of his skill as a taxidermist in the magnificent collection of beautiful birds, we award *a bronze medal.*

To S. A. Brew, of Bellefonte, Pennsylvania, for water governor for water wheels, for its simplicity, durability, and practicability, *a bronze medal.*

To D. H. Wittimore, the inventor, of Worcester, Massachusetts, for four ingenious inventions: "Union Apple Parer and Slicer," "Little Favorite Apple Parer and Slicer combined," "Bay State Apple Parer and Slicer combined," and "Little Favorite Potato Parer and Double Slicer," a diploma.

Respectfully submitted,
WILLIAM H. EGLE, M. D.,
S. F. CHAPIN,
HENRY BUTTERFIELD,
GEORGE W. STARR.

COLONEL A. K. McCLURE'S ADDRESS.

Ladies and Gentlemen: You will understand that it is through no want of appreciation of the distinction that has been conferred upon me, that I tell you that I do not appear before you with any prepared oration. This is an occasion when it is most fitting that I should discuss such questions as are most practical, and in the most practical manner. In mingling to-day with the people attending your fair, I sought the advice of a number of your leading men as to the particular topics it would be well for me to consider and discuss before you. But, so far as I could discover, no two of them agreed upon any one subject, almost everything from Mormons to greenbacks being proposed by them.

I find here not only eminent farmers, but lawyers, politicians, mechanics, and scientists. I also find your grounds pretty well covered with political candidates, and I believe every one of them has asked me to discuss and tell, if possible, the "unknown quantity" in this campaign. I regret that it is not in my power to do so, but I am happy to inform all of them that they will know exactly what it is after the election. [Applause.]

This is an occasion, ladies and gentlemen, that eminently improves all classes and conditions of society. There is no more suitable thing for the people of every community to do than to meet in what are called agricultural fairs. They serve to liberalize and broaden the intelligence of all classes of our people. They also serve to improve and elevate every class of our industries. They bring the classes of every community together, and there is no class of people who are not improved by intercourse with each other. Our people are greatly advanced, but this great branch of our industries, the greatest of all others, the agricultural, is the least progressive. Until we had agricultural fairs it was rare indeed to find an agricultural community prepared for anything like intelligent progress. And I am pained to have to declare to-day that while every other branch of industry has advanced with wonderful rapidity during the last generation, that intelligence which is most essential to the advancement of agriculture, has not kept pace with the other classes of society. There is no pursuit from the highest down to the lowest condition of life in which men are not expected to thoroughly understand that which they do, except one—the tillers of the soil. If men were to practice the professions, or if men were to engage in the mechanical pursuits of life contented with that want of intelligent understanding as is common to the agricultural classes of Pennsylvania, they would utterly fail in the most important efforts of their lives. Had I undertaken to publish a newspaper without any more knowledge pertaining to printing and publishing than that which seems to pertain to farming, I would have met with a disastrous failure. There is no man who enters his shop or store, there is no class of men in all this broad Commonwealth that is not expected to understand the cause and effect of his efforts. You have seed time and harvest, but why it is so, seems not to be a pertinent inquiry in the agricultural profession.

Go to the man who is running his machine on the grounds here to-day, or go to the man who has trained steam to perform the labor of men, and ask him why this or that is so, and he is prepared to tell you exactly what are the causes and results presented before you. I find your intelligent farmers, I mean those who read, and those who are supposed to be men of unusual intelligence, understand the quality of their soil, and the things essential in the products of their crops. Take any man who drives and works machinery, and he understands just what it is capable of, and he understands further what will supply and sustain its strength and usefulness. But who of the men who are its greatest producers—the great class of men upon whom rests the future not only of the material prosperity of the country, but the very bulwark of social order—the man of the agricultural class, and who of these pretend to know why the soil produces one particular crop and fails to produce another? I am not here, farmers of Pennsylvania, to insist that farms should be run in the closet or the study. I believe no such thing, but I do believe that the agricultural classes of Pennsylvania have fallen far short of doing their duties and responsibilities to society in failing to study that which will best give to labor, successful results. Men forget when they jog around in their fields and see them worn out by bad harvests, that God has provided for all that which will restore the fertility of the ground and bring plenty. They should remember that just so surely as they send the plow into the ground, just so surely will they help and increase its fertility. The air you breathe is what you live upon, and it is that which gives strength as well to the earth and makes harvests of plenty. Just as deep as you send your plowshare, just so deep will the pure air of Heaven permeate and enrich the soil. It gives moisture to the earth and guards it against drought and floods, and increases the productive capacity of the ground. There is nothing complicated about the laws which govern the production of grain. Man's ignorance is simply the absence of that common sense and plain, practical intelligence which men are compelled to employ in every other pursuit in life, and the reason that farmers do not become posted in their agricultural profession, is because they are not compelled to do it, while in every other pursuit they are required to study everything regarding their business. Take a pitcher on a hot day, and fill it with cool water from the spring, and the average farmer will say to you: Behold, the pitcher sweats! Is it so? It is an absolute impossibility for water to come through the pores of thick china, yet the rule of philosophy is a plain and simple one. When you send your plowshare down into the depths of the earth, the air traverses the soil and it becomes cooler than the atmosphere, and then deposits its moisture, and the soil is fertilized. These are some of the simplest laws of cause and effect, and yet they are not understood by many of the farmers of Pennsylvania. They are things which men ought to study, because it is plain, practical sense, taught every day. The progress in the agricultural profession, I grant you, has been great in the last quarter of a century, but while it has advanced, I ask you, farmers of Pennsylvania, to turn to any other pursuit in life, and tell me whether it has not advanced still more. Is this right? Is this the discharge of your duty to yourselves, to the Commonwealth, and to society? Because a farmer can eke out a mere existence, is it an excuse for not advancing when advancement is open to all? And yet this is what has been the fault, the grave and the serious defect, charged to the agricultural fraternity of Pennsylvania.

We live, ladies and gentlemen, in a peculiar condition of affairs, and in this the farmers of the country are to bear a conspicuous part. We find uncertainty stamped upon the greatest interest of the country. This does not come from the theorists, nor from the men recognized as your statesmen, nor from the leading organs of public opinion. It all comes from the circles of industry, and from the fields of agriculture. And the laws of trade, of government, of supply and demand, and of public and private interest are greatly disturbed. There is no class of industry to-day that is not disturbed. Now this is not the normal condition of a great Commonwealth like Pennsylvania; it is not the natural condition of a great and mighty people. It seems as though the people are leading the politicians, and the politicians don't know where they are to be led to. Parties are in utter confusion, and no one can tell what the result will be. I can take you to three candidates for Governor of Pennsylvania, and each of them will tell you he will be elected by one hundred thousand majority. (Applause.) Politicians simply know that they don't know anything about it, and therefore each one tells the most comforting falsehood he can in behalf of his particular cause. (Applause.) It is well to give politicians trouble sometimes, and to give them a serenade that will make them dance without knowing where the music comes from. But, farmers of Pennsylvania, this condition of things came from causes of the greatest moment to you all. Let me inquire of this class of people, what part have you borne in these disturbances? What part do you propose to perform in the solution of the problem? One of the greatest evils is that of clannish classes among our industries, and in this farmers have borne a part with the rest. Do not understand me to suggest that the Grange should be abolished, but let the Grange take care, that while the farmer sleeps, the spoiler does not sow tares in his councils, and mislead his organization in the ways of the demagogue. Men will come and talk about greenbacks and resumption, and about silver and gold dollars, and the balance of trade. They will come and talk about questions that excite the world and divide up parties, and tell you that they understand them, and that their way is the only way of settling them. Let me tell you, as one who stands above all the tempests of party faction, one who has no love for party, and who has no interest except the interests for the welfare and prosperity of the Commonwealth and of the country, that when the demagogues shall have run their course, the financial question will solve itself by the protection of national faith, and for the benefit and prosperity of the whole people. I do not say who is right or who is wrong; it is not fit that I should discuss that question here. We know that there are abuses to be corrected, and that there must be wrongs in the administration of the government, and that there must be embarrassments which are not the legitimate result of your industry.

Whether you shall have resumption or whether you shall not have it at the time appointed, I shall not now attempt to inquire. I know that it is as certain as God's own immutable law, and that it will come when the country wants it, and until then no human power can bring it. I do not inquire whether the volume of your currency is too large or too small, or whether it shall pass through national banks or through individuals. That is not the issue for me to consider. I simply mean to impress upon every man that change is not to be brought about by class legislation. I ask the farmers of Pennsylvania, and I appeal to the laborers and mechanics also, to remember that in the discharge of their duty they should ever keep in mind the fact that no one of them can prosper at the cost of the other. That there can be no prosperity of any class of people in this country unless that prosperity extends through all classes of people and society. Do you make war upon capital? That is no remedy for the wrongs against labor. Labor and capital are so linked that they are necessary to each other. They cannot be separated by any possible means save at the cost and destruction of the common prosperity of all. The farming class is the greatest in power, and I ask farmers to reflect that when they array capital against labor they simply strike at the very foundation of their own safety, and cripple the interests of the whole people. I hear of crusades against national banks, and men assail them as though they should be abolished. If they are not right, regulate or supplant them by considerate method. If there are better ways of reaching the people with money, there are wise and temperate ways of changing the laws. If you desire that there should be a larger volume of money, it is not to be attained by attacking the money-lenders of the Government. It is to be done by sending intelligent men to Congress to meet the wants of the nation.

The laboring and agricultural classes own the bankers and the money lenders. They are the masters; they make the laws; they regulate their purpose, and I desire to impress this one point upon your minds, that when you rise to assail any one class of your fellow-citizens, I care not what particular class it may be, you make a vital mistake, and strike at the prosperity of the whole country. Do you ever think, farmers, that when you come to crusade against capital, that capital wears no clothes? Money needs no garments and requires no breakfast or food to subsist upon, but when attacked, can simply await the return of better times. It is not so with the working man or the farmer. They demand constant employment. You may drive capital within its shell and it will live, but when you strike at capital, you simply strike to destroy and ruin the whole country and yourselves. I know that this is not the language that comes from those who are seeking to get your vote in one party or the other, but I tell you that these are the words of truth and soberness. There can be no attempt at class legislation that does not strike at the foundation of successful government. Do not understand me as speaking against any particular movement. I do not. I look at all parties as simply striving to carry elections. When the people of Pennsylvania and of the Union come to correct the abuses they complain of, and the wrongs they think they suffer, let them simply exercise considerate judgment and due regard for every industry alike. The agricultural class of this country, is the class that is charged with the solution of all vexed questions, and it must be the arbiter between all contending factions. They possess the homes of the land; they continue from year to year, from generation to generation, while all other pursuits follow the shifting sand of trade. They are, numerically, the most powerful, and of necessity, the most conservative, and no great issue can arise in the country, but in the end must need be adjusted by themselves. They are charged with moulding the laws of the nation, with the execution of the laws, with the protection of society and of the government, and every surge of passion must be broken and turned back by this one element of our population. They are, in fact, the guardians of our free institutions, and it devolves upon them to maintain for themselves and for their children the noblest Government of the earth.

REPORT OF THE EXHIBITION AT ERIE.

Perhaps no other point in Pennsylvania lends so many attractions to both exhibitors and visitors of a State fair, as the city of Erie, located on the beautiful lake of the same name, to which three grand Commonwealths of the Union, and a large province belonging to the British possessions, lay peaceable claim. Right royally is this elaim sustained by the peaceful disputants, and a generous rivalry for possession is as calm as the placid waters of the lake. This beautiful basin of water, bordering these grand Commonwealths, is a bountiful gift of the God of nature, looking with an omniscient eye upon the future destiny of this land of ours, peopled with its teeming millions of the happiest and freest people on the face of His own green earth. No wonder that the directors and managers of the State Agricultural Society of Pennsylvania selected this point several times in the quarter century of its existence, for its annual meeting and exhibition, and even to give to Erie the honor of selection for two consecutive years. Erie deserved it, too, for a more generous and a more hospitable people cannot be found anywhere within the borders of Pennsylvania. Besides, nature has been lavish in her gifts to the city of Erie. Possessing one of the finest harbors in the world, made so, apparently, by almost special intervention of nature over the elements and surrounded by scenery of surpassing beauty, it needs no seer to foretell her future destiny. "God made the country, but man makes the town," is scarcely expressive enough in language, when we look upon the site whereon is built a great city. God has designed certain places to be the busy marts of men, and no place on the whole continent is more signally marked, in this respect, than the city of Erie, with the one exception of New York city, where land and sea have most happily combined to force the habitation of multitudes of human beings. The waters of the inland sea and the jutting promontory of land have combined to make the site whereon Erie is located a great city in time, and to-day it is the veritable thriving city of north-west Pennsylvania.

Although the attendance upon the fair during the five days continuance was not so great as last year, due to causes that are readily and easily understood, the exhibition as a whole, in all its appointments, was a grand success. The display of blooded stock was, perhaps, the finest that has ever been exhibited in the State, and one universal acclaim of approbation came from the lips of all who were so fortunate as to witness this exhibition. Monday, the 23d of September, was nominally the opening day of the fair; but, as is usual on such occasions, the busy notes of preparation consumed the most of the day, and it was not until Tuesday, really, that the fair may be said to have commenced in earnest. The attendance on Monday, too, was quite slim, the visiting multitudes, for the most part, selecting the middle of the week for their visit to the great fair. Tuesday ushered in its dawn with cloudy and threatening weather, and this kept many hundreds from the fair. But Wednesday and Thursday came as beautiful days of early autumn, and brought with them a multitude of sight-seers from far and near. Had the attendance on Friday, the last day of the fair, kept pace with Wednesday and Thursday, the exhibition would have been a complete financial success to the society. Although covering a period of five days, from Monday till Friday, inclusive, the real interest of the fair at Erie was concentrated in the two days when the grounds were thronged with visitors. It takes a crowd to make a fair complete in itself, and without it there is always a barrenness—a something wanting, that is painfully felt by all interested. When Wednesday came, with its host of twelve to fifteen thousand people, and Thursday, with its crowd, not so large, but more appreciative, (since Wednesday was selected as the day for the school children of Erie,) everybody seemed well pleased and smiling at the success of the undertaking.

Tuesday was set apart as the day for the inspection of the cattle stock. Judges and exhibitors were, of course, alike busy, and the numbers that gathered about each animal brought out for inspection, showed that much interest was manifested in the competition among the respective owners. The grand cavalcade on Thursday, embracing the fine exhibition of blooded stock, was an event long to be remembered. The procession was formed on the west side of the race track, and then, with a band of music at its head, proceeded to make two rounds of the entire track. Some idea of the extent of this exhibition will be inferred, when it is stated that the prize cattle and horses in line were massed in a space fully occupied and reaching half a mile in length, and wide enough for half a dozen animals to stand abreast. In the line of horses were Hambletonians and all the other fine breeds, while the cattle were composed of all the best breeds, including Devons, Holsteins, Durhams, Jerseys, Ayrshires, Short Horns, and, in fact, nearly every kind of thorough-bred bulls, heifers, and steers. The awards of the judges of the blooded stock appended to this report, will give some idea of the difficult task imposed upon these gentlemen in reaching a decision among so many animals, not one of which was not deserving of honorable mention.

The Races.

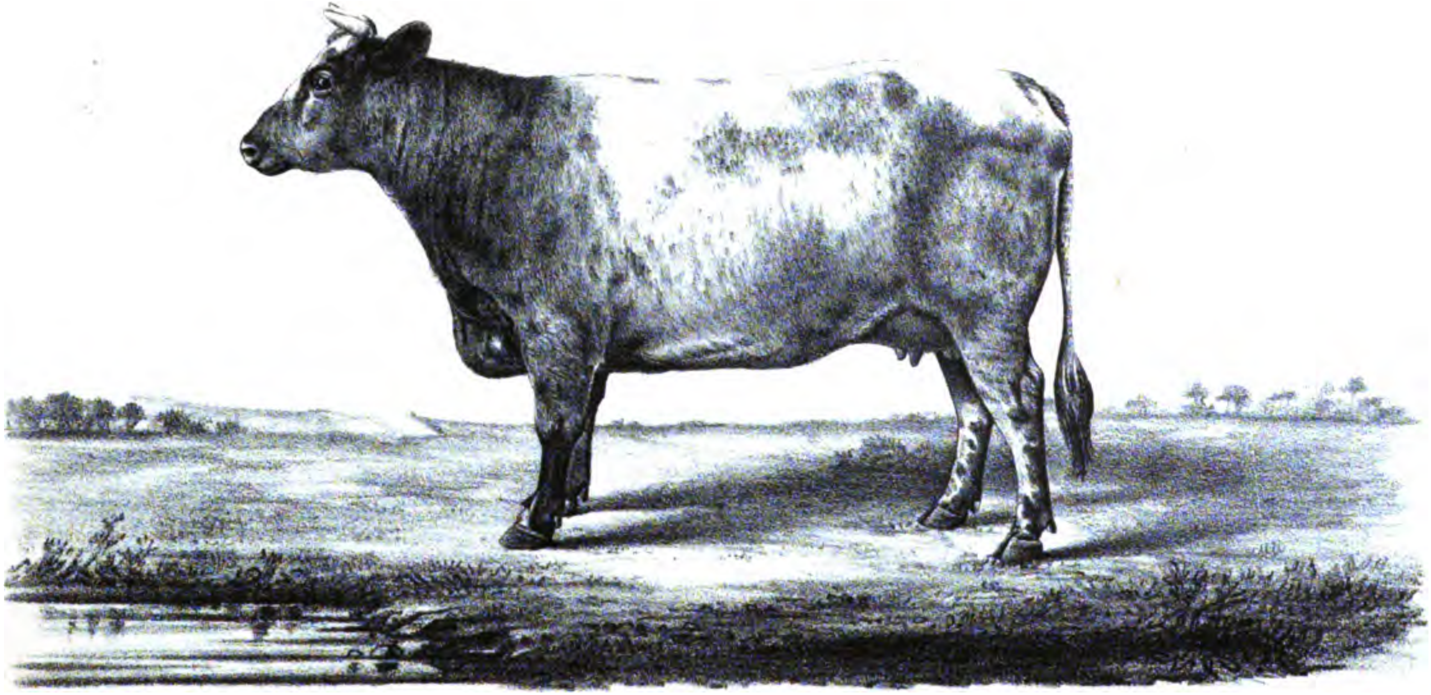
Of course, at all agricultural fairs, the race course is the great center of attraction for a majority of visitors. Some of the private turnouts were very fine, and a four-in-hand attracted universal attention. A band of music occupied the music stand each day of the races, and discoursed fine music for the occasion. Considering the routine of detail work which, until Tuesday afternoon, seemed to pervade the fair, the race course then relieved the monotony.

Fast horses dashing over the smooth track at almost lightning like speed, gladsome faces and loud huzzas, the waving of kerchiefs and the exciting music, that the horses seemed to enjoy as well as the ladies and gentlemen present, all made up a scene of the most intense interest. There were but two races on Tuesday, one for the five year old purse, and the other for horses that had never beaten 2.34. The first of these races required but three heats to settle the contest, Phil. Sheridan winning each of the heats. Five horses were entered:

E. D. Calvin's b. g., Phil. Sheridan,	1	1	1
C. W. Reed's b. g., Henry Clews,	4	2	2
William Moore's c. g., Silver Cloud,	2	4	3
W. R. Denton's b. g., Loafer,	3	3	4
A. J. Dolman's b. g., Transit,	5	5	5

Time, 2.40, 2.41¼, 2.41¼.

The second race took five heats to decide the winner. Five entries were made:



PRIZE SHORT HORN HEIFER

Owned by R.G.Dun & Co.

Erie.1878.

Photo. from Life by Hovey. Phil^{a}.

J. D. Heard's b. m., Annie Golddust,	3	2	1	1	1
P. G. Stratton's b. m., Maria Wilson,	1	3	2	2	2
L. F. Harrison's b. s., Kindle Star,	2	1	3	3	3
A. Erwin's b. m., Ruby Golddust,	4	4	4	4	4
C. T. Homewood's b. m., Mollie McCarty,	5	withdrawn.			

Time, 3.00, 3.01, 3.03, 3.02¼, 3.05. Purse $150.

The races on Wednesday were much better than those of Tuesday.

FIRST RACE.

Purse $100 for horses that have never beaten three minutes. Five entries:

J. Shillinglaw, b. g., Northern Spy,	1	3	1	1
J. Thickstone, c. s., Goldstone,	3	1	2	2
J. D. Heard, b. m., Annie Golddust,	2	4	4	3
G. W. Dillard, b. g., Big Fellow,	5	5	5	4
C. T. Homewood, r. s., Dorsey,	4	3	3	5

Time, 3.05, 3.02, 3.01, 3.00.

SECOND RACE.

For all horses that have never beaten 2.40. Purse $150.

Ed. Galvin's b. g., Phil. Sheridan,	1	1	1
J. Shillinglaw, b. g., Henry Clews,	2	2	2
Ed. Galvin, b. m., Pale Face,	withdr'n.		
A. J. Oatman, b. g., Transit,	3	3	3

Time 2.40.

MIDNIGHT'S TRIAL.

Mr. C. M. Reed's trotting horse, Midnight, undertook the feat of trotting a mile in less than 2.20. He was accompanied by a running mate for the purpose of forcing the speed. Time 2.26. A high wind prevailing at the time, prevented further trials.

The races on Thursday were fully as interesting as those on Wednesday, and the track was in finer condition. The first race was the 2.50 class:

— Cooper's g. m., Kitty Cooper,	2	2	1	1	1
L. Thickstone's c. s., Goldstone,	1	1	2	2	2
C. T. Homewood, b. s., Dorsey,	3	3	3	3	4

Time 3.00.

The free for all only brought out two entries:

Ed. Galvin. b. g., Sleepy Tom,	1	1	1
Ed. Galvin, b. g., Phil. Sheridan,	2	2	2

Time 2.40, 2.37, 2.37.

This ended the trials of speed, as it was deemed expedient to dispense with races on Friday, owing to the slim attendance at the fair on this the closing day.

Thursday was the day set apart by the managers of the State society for the address of Honorable A. K. McClure, of the *Philadelphia Times*. The reputation of Colonel McClure as an editor and writer upon all subjects of vital interest to the people of the State is well known throughout the length and breadth of the Commonwealth. This knowledge, of course, drew a large and appreciative audience to the fair grounds to hear him dilate upon agricultural matters. Honorable John P. Vincent introduced the orator of the day to the vast audience of ladies and gentlemen in a few well timed and appropriate remarks. The orator felicitated the assembled multitude on the important occasion that brought them together. All classes and conditions of society are improved by such associations, no matter what may be the political complications that convulse the politicians in the country. Here is exhibited the real worth of the State, and before this altar all must bow in humble adoration. There is no more suitable thing for a people to do in any community than to assemble in what are called agricultural fairs. They serve to liberalize and broaden the intelligence of all classes of our people. They improve necessarily and elevate every class of industrial pursuit. They tend to bring the classes of every community together, and every class is benefited by its intercourse with another. But of all pursuits, that of agriculture, is the least progressive. Until the introduction of agricultural fairs, it was rare, indeed, to find an agricultural community prepared for anything like intelligent progress. Whilst every branch of industry has advanced with wonderful rapidity in the last generation, that intelligence which is most essential for the advance of agriculture has not kept pace with the other classes of society. There is no pursuit from the highest to the lowest condition in life in which men are not expected to understand what they do, except one, the tillers of the soil. If men were to practice their professions, or if the men engaged in the mechanical pursuits of life were contented with the want of intelligent understanding, as is common with the agricultural classes in Pennsylvania, they would utterly fail in the most important efforts of their lives. All men are expected to understand the cause and effect of their efforts. The reason why seed time and harvest come in regular and undeviating succession, seems to be no subject of pertinent inquiry with our farming communities. Go to the man who is running his machine on the grounds today, or go to the man who has trained steam to perform the labor of men, and ask him why this or that is so, and he will talk to you understandingly of that which is his business, and concerns him the most. How many otherwise intelligent farmers understand fully the quality of their own soil, and the essential elements for the production of the best crops? Take any man who drives and works machinery, and he understands just what it is capable of, and he understands further what will supply and sustain its strength and usefulness. But who of the men who are our greatest producers—the class of men upon whom rests the future, not only of the material prosperity of the country, but who are the very bulwark of social order—the men purely of the agricultural class, and who of these pretend to know why he soil produces one particular crop and fails to produce another?

Agriculturists forget, as they jog along in the daily routine of farm duties, over worn out lands and bad harvests, that God has provided that which will restore the fertility of the soil and bring plenty. The air we breathe gives strength to the earth as well. Just as deep as you send your plow-share, just so deep will the pure air or heaven permeate and enrich the soil. The same causes that precipitate the moisture in the air on the outside surface of a glass of cold water, fertilizes the soil when turned up with its plowed surface exposed to the air. The orator of the day then proceeded to discuss freely the political and financial problems of the day, in their general bearing upon agricultural communities, and the duties imposed on the tillers of the soil, to boldly meet the issues that our politicians in the main fail to meet and settle satisfactorily. The address was well received and attentively listened to by most of the vast concourse of people present, and the lessons imparted will not be lost upon an appreciative audience like that assembled on that day at the State fair held at Erie. While in this connection it may be as well to state that practical agricultural chemistry, as the legitimate offspring of investigation in the study and laboratory of the chemist, has made rapid strides in the past few years. In Germany and France the practical farmer and tiller of the soil now makes his own experiments, based upon previously known scientific truths, and the knowledge is easily imparted, without the necessity of long continued application in the laboratories of the schools. The crudest kind of farming, and the most ignorant tiller of the soil, owe whatever success follows laborious effort, to long established usage, and this in turn has been established aforetime by experiment, and confirmed by science in due season. So in progressive farming in our day, learned pioneers in agricultural chemistry, like Baron Liebig and Professor Hitchcock, clear the pathway of all technical rubbish, and leave the road open to all, so that he who runs may read.

THE STOCK DEPARTMENT

Contained the finest display of horses, cattle, sheep, and swine ever exhibited at a fair in this State, and this remark was general among all the visitors at the fair. Mr. D. D. Tracy's (of Erie) exhibit of fine cattle, perhaps excelled all other exhibitors. The bull "Hector" is as fine an animal as ever trod hoof. He is of an orange color, with jet black spots, four years old, and weighs two thousand five hundred pounds. Then came his two celebrated "Holstein" cows, with a record of forty-eight and sixty pounds of milk per day, and his "Geneva Duke," from "Lady Eva," giving on an average ninety pounds of milk per day.

The judges on thorough-breds and herds submitted the following report:

"Your committee on herds and thorough-bred cattle respectfully report that they found so many exceedingly fine cattle in each herd, that it was very difficult to decide, being obliged to come down to very fine points. We think there has never been shown at one State exhibition, so many heads of excellent animals in each herd, as there is now on exhibition. Mr. Rundell, of North East, has on exhibition a herd of finely bred Short-Horns, but owing to their being in very low condition, could not compete with the other herds. Mr. James Miles, of Miles Grove, also had on exhibition and competition a herd of exceedingly fine and well bred Short-Horns, but kindly withdrew them from competition, to act as one of the judges of your committee."

FINE BRED HORSES, MARES, AND COLTS, MATCHED TEAMS, AND STALLIONS, AND MARES FOR ALL WORK.

The display in all these classes received the encomiums of every visitor to the fair interested in fine stock, and how the judges could arrive at a decision without being perplexed, was a mystery to the silent but admiring spectator.

SWINE.

In the exhibit of swine, of course Townsend, Walter & Son, of West Chester, Pennsylvania, and E. B. Ashbridge, of Chester county, were foremost in the display of the celebrated "Chester Whites," and both retired from the fair covered with laurels and their pockets full of premiums.

SHEEP.

The display here was wanting. The judges report as follows: "Your committee regret to find so few American or Spanish merino sheep on exhibition. On examination, the covering is found very good, but as to condition of animals, for want of more flesh, are of no credit to the exhibitor or the exhibition, and for this reason have omitted making any award to Thomas A. Bemus, for his ram 'Climax,' also, to E. Rundel, for two rams exhibited by him in like condition. They would, however, recommmend a premium of ten dollars to E. Rundel, for five lambs exhibited as the get of his ram." T. Walter & Sons, West Chester, Pennsylvania, carried off the first prize for the best fleece of Lincoln wool.

MAMMOTH CATTLE.

The Mammoth "show" cattle from Poughkeepsie, New York, were one of the side attractions of the fair. The owner of these two cattle still offers a premium of $500, open to the world, to any one to show a heavier and better cow than his "Queen of Cattle;" also, $500 to any one to excel in weight, at same age, his celebrated "Champion." These cattle are unquestionably the heavies living cattle in the world, and during the crowded days of the fair, the tent inclosing them was thronged with visitors.

THE HOME DEPARTMENT OF THE FAIR.

There were not as great a variety of displays in the home department as could have been desired. Mrs. G. H. Bull, made an elegant display of millinery and fancy goods, which occupied the large space between the entrances at the eastern end of the building. French & McKnight, Wells, Richardson & Co., and others, displayed a full line of articles, but there was ample room for a more creditable exhibit. P. Minnig's display of goods was very fine, and was the admiration of large crowds. The exhibit was well ornamented with "first premium cards," showing that they had been successful in everything for which they had made an effort. P. Minnig's exhibit, in connection with that made by S. S. Marvin & Co., of Pittsburgh, manufacturers of crackers, &c., is the most attractive of any yet made in the home department. The furniture display of Messrs. Riblet, Bros., of Erie, is exceptionably fine. It consists of one elegant Turkish parlor set in brown figures, heavy puffed with satin, making the most magnificent specimen of furniture on the ground. The display of the household effects of Messrs. F. F. Adams & Co., was also very fine. The Erie Chair Company made a fine exhibit. The same may be said of the St. Louis Stamping Company, and the display was awarded the highest honors. The kitchen utensils manufactured by this company do not corrode or rust like the ordinary utensils in use, and the fine gray or stone color gives them a nice appearance.

POULTRY.

This display was very fine, and captured all the lady visitors at the exhibition. The display was quite full, and was a great center of attraction during the crowded days of the fair.

PLOWS.

In the class of plows the committee made the following report: "We, the committee, make the following report: After giving Brown's adjustable harrow full consideration, we recommend to farmers this harrow as a No. 1 implement. H. M. Reed & Co.'s display of the different kinds of plows and other farm implements is a credit to Erie city and the State, and we fully recommend them to the consideration of every agriculturist in the State. Randall's pulverizing harrow, in our judgement, is a grand farm implement, and should be in possession of every farmer in this State, as indispensable, especially to seed sowers and grain raisers, and we recommend it to all agriculturists. The Lawrence & Chapin diamond plow is a No. 1 plow, and we consider it the leading plow of the day, and well adapted to sod as well as stubble grounds, and more than meets our sanguine expectations. We recommend the South Bend chilled plow as worthy the consideration of all farmers, and should be given a trial before purchasing any other."

The South Bend Chilled Plow

is deserving of special notice, on account of its beautiful finish and perfectly fitting parts, and was admired by all interested in farm implements. It is said to be the steadiest running, lightest draft, and the easiest handled plow in the market, and the manufacturers prove these claims by testimonials from farmers who have used them in nearly every State of the Union. This plow has a straight landslide.

Reaping and Mowing Machines.

The committee reported as follows: "The committee report that every member has been in the habit of attending State fairs for many years, and being personally interested in the working of machines upon their farms, have noticed the improvements from time to time. The present exhibition exceds any, in their opinion, it has been their privilege to examine. A number of very valuable improvements have been made, both in mowers and reapers, in lightening the draft, carrying the cutter bars, adjusting the wear and tear of pitman rods, and carrying the knives and platforms in going to and fro the fields, and stowing away in barn. They examined every machine entered for exhibition, and were fortunate in finding a representative present to explain the advantages and latest improvements. With so much of excellence in each, it is hard to discriminate without an opportunity of seeing them operate in the field. There being no special premiums offered, and the committee thus being 'stopped from awarding them, they confine themselves to a short expression of opinion as to the value of the several machines examined.

D. M. Osborn & Co., Auburn, New York, exhibit single mower and reaper, and self-binding harvester. The committee had an opportunity of seeing the binder operate, and it was all that could be desired by the most captious, binding a sheaf from two inches in diameter to eighteen inches, and doing its work perfectly. In their mowers they claim an improvement, inasmuch as the shoe runs behind the driving wheel.

The committee recommend special mention of the "Champion" reapers and mowers, exhibited by Warder, Mitchell & Co., Springfield, Ohio; the "Empire," exhibited by J. F. Seiberling, Akron, Ohio; the "New Warrior" mower, exhibited by S. B. Ellis, Erie; the "Buckeye" reaper and mower, exhibited by Altman, Miller & Co., Albion, New York; the combined reaper and mower, exhibited by English & Dixon, New Philadelphia, Ohio.

Cultivators, Grain Drills, and Sowers.

No premiums awarded. But the committee reported that the Randall corn harrow, manufactured by the "Warrior Mower Company," Little Falls, New York, was the best implement of its kind on exhibition, and recommended a special premium. The committee also reported that the farmers' favorite grain drill, manufactured by Bickford & Huffman, Macedon, New York, was a superior machine, and superior to any on exhibition. The committee also made special mention of the "Paxton" grain drill, manufactured by the Harrisburg Car Manufacturing Company, Harrisburg, Pa.

The display of all kinds of agricultural implements was most excellent, and deserves all the praises that can be bestowed upon it.

THE CARRIAGE DEPARTMENT

Was represented by celebrated manufacturers from several States in the Union, and to say that the exhibit of phaetons, carriages, farm wagons, buggies, &c., was exceedingly fine, is only to state the truth.

THE STOVE DEPARTMENT,

As usual, was represented largely in first class goods, embracing every variety in the line of parlor, cooking, and other stoves, in endless profusion.

IN THE FRUIT AND VEGETABLE DEPARTMENT,

Mr. James Halliman presented a very fine display, and, of course, received the first awards of the exhibition. The fruit department was considerably enlivened by a grand display of confectionery, bread, cakes, and pies, exhibited by an enterprising Erie merchant, Mr. M. Mauer.

THE BAY STATE IRON WORKS.

Although Messrs. Noble & Hall did not enter into competition for premiums at the fair, they were, nevertheless, given the contract for supplying a large proportion of the power for machinery hall, at the west end of which place they had in position one of their model engines. This firm has a wide reputation as manufacturers of engines and boilers.

JARECKI MANUFACTURING COMPANY, OF ERIE.

This company had on exhibition, in the machinery department, an oil engine, which has a number of excellent points. It has Hammond's patent balance slide valve, which takes less power to move than the ordinary valve, making the engine more powerful, and easier to reverse. The engine is very light for the size, but is strongly and compactly made.

THE LITTLE GIANT WATER MOTOR.

At the west end of machinery hall, Coates & Cleveland exhibited their "Little Giant," beyond question, one of the most perfect water motors made. It is an Erie invention, and deserving of notice. Its points are: Simplicity of construction, it is absolutely noiseless, and it has no dead centers upon which to stop, and it can be run from one stroke to two hundred per minute. Besides this it has a variable stroke, and is capable of being changed from a two inch to a full length of cylinder.

IN ALL THE DEPARTMENTS

The display was profuse and imposing. Machinery hall, during the whole time of the fair, was a busy place to visit. Agricultural hall had its many attractions, and the ground was fairly strewn with implements and contrivances of every description. The most inviting place to while away an hour pleasantly and profitably, was

FLORAL HALL,

With its exotics and plants of every kind. Many of the floral baskets and bouquets, in this department, were artistic and beautiful. In the

FRUIT DEPARTMENT,

Miss Jennie Jones exhibited a large basket of apples, arranged in pyramidical form. Mr. James A. Nelson, of Mercer, Pa., made a fine display of fruits, showing no less than one hundred and fifty varieties of apples, pears, peaches, and grapes.

BURDETT ORGANS.

The display by this company was an interesting one. Four splendid organs, of their own manufacture, were placed on exhibition. One of them was a ten stop parlor organ, with handsome pipe tops. It has two sets of reeds, octave coupler, and sub-bass, and is one of the most popular styles now in use. One of them represented the piano style. Another was a fifteen stop organ, with only one key-board. The combination double bank organs, for church service, are peculiarly adapted to orchestras, on account of its variety of tone combinations.

THE CHICAGO AND ERIE STOVE COMPANY

Occupied, with their display, fully one half of the stove department, and their exhibit was one of the finest ever made on the grounds.

THE ERIE CITY CARRIAGE WORKS

Made a superb display of carriages, wagons, etc., all made by these celebrated manufacturers. They exhibited a magnificent line of goods.

THE DUDLEY TORSION SPRING COMPANY.

This company had on the grounds a fine display of springs, all made on the torsion principle, conceded by all good judges to be the best and safest springs now in use. Many of these springs were on the carriages and wagons in the carriage department.

DINNING-ROOM AT THE FAIR GROUNDS.

The dining room on the grounds was run, as heretofore, in the interest of the Home for the Friendless, a charitable institution in the city of Erie. Self-sacrificing ladies of this beautiful lake city saw their opportunity, in the hungry crowds that visit our fair, to raise a fund to help the friendless in their midst, and it is needless to add that the managers of the State society cordially coöperated with the ladies of Erie in their laudable enterprise. The dinners served satisfied the most fastidious, in short, the hotels could not do better if they tried never so hard. It was always a pleasure during the continuance of the fair to dine at the tables served by the charitable ladies of Erie.

SUMMARY OF THE FAIR AT ERIE.

Friday the closing day came, and the fair of the State Agricultural Society, at Erie, for the year 1878, and the twenty-fifth since the organization of the society, was a thing of the past. As a financial success, the sanguine expectations of the managers were not realized. The society had incurred heavy expenses incident to such an undertaking, and it therefore confidently expected larger returns from the gates than were received. Monday, the opening day of the fair, was nothing more than an opening day, and although by this time, through the energy and perseverance of the officers of the society, nearly everything was in place to make a good "show," but few persons visited the grounds. On Tuesday even the expected crowd did not come, although in the morning everything important to the exhibition was in place. Wednesday turned out to be a very successful day, and the hopes of the managers were correspondingly raised. The crowd was large on this day, and as great as the most enthusiastic could wish, and the day's sports on the race course were exceedingly interesting. Thursday was also a very successful day as to numbers in attendance upon the fair, but the crowd even on this day was not as great as that of Wednesday. Friday, the closing day, turned out to be a meager one as to numbers in attendance. Out of the five days during which the fair was in full blast, there were really but two paying days. This is partly accounted for by the fact that this was the fourth agricultural fair held at Erie within the past six years, and the second consecutive annual held by the State society on these grounds, so that the people in the surrounding districts began to look upon fairs as a thing of ordinary occurrence in their midst. Besides this fact the general prostration in all business pursuits has its effect upon all undertakings of this nature, but it is only reiterating the sentiment of every visitor when we say that

THE FAIR WAS A GRAND SUCCESS.

In all the departments which properly belong to an agricultural fair, the exhibits were unusually good, and the stock department was composed of the best thorough-bred stock ever exhibited in this or any other State. This attraction alone ought to have secured a full attendance on each day of the fair.

All the officers of the State society were present, and from the president down were alike indefatigable in their efforts to make the fair a paramount success. Many of the ex-presidents and vice presidents of the association were also present, in the capacity of judges, and in lending valuable assistance whenever and wherever required. In the vast display, such as that made at Erie, considerable executive ability was called into action, in order that everything should move along systematically, and the experienced officers of the society were equal to the occasion, as all can testify who participated either as exhibitors or spectators. So far as can be learned, not one word of complaint came forth from any one in attendance, and throughout the whole fair the best of order prevailed on all occasions. It was a source of regret that more of the farmers of Pennsylvania from a distance were not present on such an interesting occasion. But when it is taken into consideration that nearly every county in the State holds its own county fair at this season of the year, the cause of the absence of many could be easily explained. Yet it cannot be denied that our annual State fair has peculiar claims upon the agricultural people of Pennsylvania. A State like ours, so rich in its varied resources, cannot afford to overlook the noble pursuit of agriculture that in reality supports and sustains them all. Besides, we are by force of circumstances a progressive people, and progress is plainly marked upon every pursuit in life, more than is exhibited in the occupation of the tiller of the soil. This should not be, and to remedy this defect the State Agricultural Society, as the head and director of agricultural improvements in the State, should be liberally patronized and sustained by all classes of people and all kinds of pursuits in the State.

In whatever part of our Commonwealth the next annual State fair shall be held, it is to be hoped that all classes of our fellow-citizens will coöperate with the officers and managers of the State society, to make these exhibitions what they were designed to be, viz: The exponent of what the whole State can produce, and to show to other States in the Union the diversified resources of Pennsylvania.

Awards of Premiums.

CLASS I.—Thorough-Bred Herds.

D. D. Tracy, best Holstein herd,	$40
Walter Cole, Batavia, best Devon herd,	40
C. B. Moore, Christiana, best Jersey herd,	40
A. J. Wilson, Grafton, Ohio, best Ayrshire herd,	40
Charles Lincoln, Lewisburg, best herd Short Horns,	40

CLASS II.—Thorough-Bred Cattle.

Ayrshires.

G. W. Crandall, second best Ayrshire heifer, under five months,	$5
William Fairweather, McLane, best Ayrshire bull, two years old,	20
Same. Best Ayrshire cow, two years,	15
Same. Best Ayrshire bull, one year,	15
E. R. and W. L. Cowden, Harbor Creek, best Ayrshire bull, "General Brock," four years,	25
Same. Best Ayrshire cow,	15
A. J. Wilson, Grafton, Ohio, second best Ayrshire bull, three years and upwards,	20
Same. Best Ayrshire bull, one year and under two,	15
Same. Best Ayrshire calf, under one year,	10
Same. Best Ayrshire cow, three years and upwards,	20
Same. Second best Ayrshire cow, two years and under three,	10
Same. Best Ayrshire heifer calf,	10

Holsteins.

D. D. Tracy, best Holstein bull, "Geneva Duke," two years,	$20
Same. Best Holstein cow, seven years,	20
Same. Second best Holstein heifer, three years,	15
Same. Best Holstein heifer, two years,	15
Same. Second best Holstein heifer, one year,	10
Same. Best Holstein heifer, one year,	15
Same. Second best Holstein calf, one month,	5
Same. Best Holstein calf, two months,	10
E. E. Chambers, North East, second best imported Holstein bull,	20
D. D. Tracy, Erie, best Holstein bull, "Hector," four years,	25
Same. Best Holstein bull, "Harry," one year,	15
Same. Best Holstein bull, "Daisy Duke,"	10
Same. Second best Holstein heifer, two years,	10

Devons.

E. C. Westfield, second best Devon bull, under three years,	$20
Same. Second best Devon bull, under two years,	10

Same. Second best Devon bull, under one year,	$10
Same. Second best Devon cow, under three years,	15
Same. Best Devon heifer, under two years,	15
Same. Best Devon calf,	10
Walter Cole, Batavia, New York, best Devon bull, four years,	25
John Welker, best Devon bull, two years,	15
Walter Cole, best Devon bull, one year,	15
Same. Best Devon cow,	20
Same. Second best Devon cow,	10
Same. Best Devon heifer,	15
Same. Best Devon bull calf, seven months,	10
Same. Second best Devon heifer calf,	5

Jerseys.

C. B. Moore, Christiana, Pa., best Jersey bull, over three years,	$25
Same. Best Jersey bull, over two years,	15
Same. Best Jersey cow, over three years,	15
Same. Best Jersey cow, over three years,	20
Same. Best Jersey heifer, between one and two years,	15
Same. Best Jersey heifer, two years,	15
Same. Second best Jersey heifer, between one and two years,	10
Same. Best Jersey calf,	10

Durhams.

James Miles, Miles' Grove, best Durham bull, Morning Star 2d,	$20
Same. Second best Durham bull, one year,	10
Same. Second best Durham heifer, two years,	10

Short-Horns.

R. G. Dunn, London, Ohio, best Short-Horn cow, four years and over,	$20
Same. Best Short-Horn cow, one year and under two,	15
Same. Second best Short-Horn heifer calf,	5
Charles Lincoln, North Lewisburg, Ohio, best Short-Horn bull, three years and over,	25
A. C. Chase, Leavittsburg, Ohio, second best Short-Horn bull, three years and over,	20
A. C. Fuller, best Short-Horn bull, under one year,	10
Same. Second best Short-Horn heifer, between one and two years,	10
Charles Lincoln, best Short-Horn bull, one year and under two,	15
Same. Second best Short-Horn cow, three years and under four,	10
Same. Best Short-Horn cow, two years and under three,	20
Same. Best Short-Horn heifer calf,	10

Alderneys.

Peter Runser, Harbor Creek, best Alderney bull, four years,	$20

The judges in the above class submitted the following report:

Your committee on herds and thorough-bred cattle respectfully report that they found so many exceedingly fine cattle in each herd, that it was very difficult to decide, being obliged to come down to very fine points. We think there has never been shown at one State exhibition, so many heads of excellent animals in each herd as there is now on exhibition. Mr. Rundell, of North East, has on exhibition a herd of finely bred Short-Horns, but owing to their being in very low condition, could not compete with the other herds. Mr. James Miles, of Miles Grove, also had on exhibition and competition a herd of exceedingly fine and well bred Short-Horns, but kindly withdrew them from competition, to act as one of the judges of your committee.

Herds Working Oxen, and Fat Cattle.

E. R. & W. L. Cowden, Harbor Creek, best six heifer calves,	$10
D. D. Tracy, twenty-five head, held and owned as farm stock,	25
Frederick Olds, Summit, best yoke oxen, four years old,	10

Native and Grade Cows.

H. H. Russell, best native heifer under one year,	$5
R. G. Dunn, London, best fat heifer,	10
G. Shattuck & Son, Erie, best heifer calf under one year,	5

CLASS III.—Fine Bred Horses, Mares, and Colts.

J. C. Vanscoter, Erie, stallion "Pat Machree," first premium,	$50
R. A. Stratton, Evansburg, stallion "Hull," second premium,	30
J. C. Vanscoter, Erie, stallion "Enfield, Jr.," four years old, first premium,	25
M. B. Thayer, Linesville, stallion "Bigaroon, Jr.," four years old, second premium,	15
A. E. Bliss, Conneaut, Ohio, stallion "Buckeye," three years old, first premium,	20
A. Whipple, Saegertown, stallion "Gettysburg," three years old, second premium,	15
Thomas Batton, Harbor Creek, stallion "Claude Kelly," two years old, special premium,	10
Israel Thickstun, yearling stallion, first premium,	10
E. C. Custard, brood mare, foal at foot, first premium,	15
J. H. Welsh, mare, four years old and upward, first premium,	15
Albert Erwin, mare, four years old and upward, second premium,	10
S. Short, mare, three years and under four, first premium,	15
Albert Erwin, mare, three years and under four, second premium,	10
Jesse Ebersole, yearling mare, first premium,	5
C. G. Dempsey, exhibit of thorough-bred stallions, mares, colts, and fillies, special premium,	50
S. Short, stallion "Trifle,"	Society's medal.

CLASS IV.—Trotting Horses, Mares, and Geldings.

Full accounts of the races have been published.

CLASS V.—Matched Teams.

G. H. Howard, Wattsburg, pair coach horses, first premium,	$25
James Janes, Linesville, family horse, first premium,	10
Thomas Prendergrast, Westfield, New York, pair light geldings for harness, first premium,	25
C. B. Willis, Fairview, family mare, first premium,	10
C. W. Clark, Wattsburg, pair light harness mares, scond premium,	15
George S. Churchill, Erie, mare for saddle, first premium,	10
J. C. Vanscoter, Erie, gelding for harness, second premium,	5
Albert Erwin, Mosiertown, gelding for saddle, second premium,	5
Same. Pair matched geldings, second premium,	15

CLASS VI.—Stallions and Mares for all Work.

Martin Hall, Elk Creek, one stallion, two years, second premium,	$5
Daniel H. Alden, Concord, Pennsylvania, one stallion, two years and under four, first premium,	10
W. O. Clark, Wesleyville, Pennsylvania, mare, two years old and under four, first premium,	10
J. W. Thompson, Drake's Mill, "Young Napoleon," four years and under six, second premium,	10
Mott Sherman, Albion, Pennsylvania, imported stallion, "Paris," ten years, special premium,	10
Same. Stallion, one year, first premium,	10
J. C. Beard, Waterford, stallion, "Young Messenger," over six years, second premium,	10
M. Driggs, Erie, mare, five years old, second premium,	10
F. B. Willis, Fairview, mare, second premium,	5
C. F. Sweet, Edinboro', mare, two years and under four, second premium,	5
George Cutler, West Greene, mare, one year and under two, first premium,	6
Elijah Crow, Washington township, mare, six years and upwards, first premium,	15
F. A. Jacobs, Erie, stallion, "Bay George," five years old, first premium,	15
A. Whipple, Saegertown, stallion for all work, first premium,	20

CLASS VII.—Jacks and Mules.

George Bowman, Spring, Pennsylvania, best pair mules,	15

CLASS VIII.—Flocks and Fleeces.

T. Walters & Son, West Chester, best fleece Lincoln wool,	$5
Thomas A. Bemus, Ripley, second best fleece wool from buck twelve months old,	5

Report of the Judges.

Your committee regret to find so few American or Spanish merino sheep on exhibition. On examination, the covering is found very good; but as to conditfon of animals for want of more flesh, are of no credit to the exhibitor or the exhibition, and for this reason have omitted making any award to Thomas A. Bemus, for his ram "Climax;" also to E. Rundell, for two rams exhibited by him in like condition. They would, however, recommend a premium of ten dollars to E. Rundell, for five lambs exhibited as the get of his ram.

Fine Breed Sheep.

T. Walters & Son, West Chester, best fleece Lincoln wool,	$5
E. Rundell, North, East, second best pair Spanish ewes,	5
Thomas A. Bemus, Ripley, best ewes, three years old,	10
George Cutler, West Greene, best pen, five ewes,	10

CLASS IX.—Swine.

P. M. B. Nicholson, West Millcreek, one Poland China boar, over one year and under two, first premium,	$10
Same. Poland China boar, under ten months, first premium,	5

E. Rundell, North East, one Victoria boar, ten months; one Victoria boar, one Victoria breeding sow, one year old; and one Victoria sow, six months and under one year. All very fine hogs; but not provided for by premium list.

C. B. Moore, Christiana, Berkshire sow, "Pride of Glendale," imported, first premium,	10
Same. Berkshire boar, "Star of Kentucky," over two years, first premium,	10
Same. Berkshire boar, "Swanwick Star," first premium,	5
Same. Berkshire boar, "Smithereen X," first premium,	5
Same. Lot of five Berkshire pigs under six months, first premium,	5
H. Shattuck & Son, Chester White boar, fifteen months old, first premium,	5
F. D. Raymond, Findley's Lake, New York., Berkshire bore over one year and under two, first premium,	10
C. B. Ashbrige, Chester county, herd of Chester Whites, forty-three head, first premium,	10
Same. Boar two and one half years, "Jack," Chester White, first premium,	5
Same. Chester White boar, eight months, second premium,	3
Same. Six pigs, fourteen weeks, first premium,	5
T. Walter & Sons, West Chester, Pennsylvania, Chester White boar, over two years, first premium,	10
Same. Chester White boar, "Kennett Second," under ten months, first premium,	5
Same. Chester White sow, one year and over, first premium,	10
Same. Berkshire boar, ten months, second premium,	3
Same. Chester sow, six months and under one year, first premium,	5
E. C. Bliss, Westfield, New York, Suffolk boar over two years, first premium,	5
Same. Suffolk breeding sow, one year and over two, first premium,	10
Same. Five Suffolk pigs under six months, first premium,	5

CLASS X.—Poultry.

E. A. Woodbury, Erie, best trio of Plymouth Rocks, one and a half years,	$2
J. A. Webster, Fairview, best pair Bronze Turkeys,	2
Same. Best pair Rouen ducks,	2
Frederick Clark, Erie, best trio Golden Polands, one and a half years,	2
R. M. Bonnell, Wesleyville, best pair White ducks,	2
J. Bryant, Erie, exhibition of pigeons,	1
Frederick Hennan, Erie, best pair Partridge Cochins,	2
John Eaton, Fairview, best pair Pea fowls,	2
Same. Best pair Geneva fowls,	2
C. K. Dickinson, best pair Cayuga ducks,	2
D. Mehen, Erie, best pair Dark Brahmas,	2
Same. Best pair Brown Leghorns,	2
Albert Cutler, W. Greene, best pair Muscovy ducks,	2
J. and G. Boyer, best trio White Cochins,	2
L. A. Burgess, best pair Buff Cochins,	2

CLASS XI.—PLOWS AND PLOWING.

In this class the committee made the following report:

We, the committee, make the following report: After giving Brown's adjustable harrow full consideration, we recommend to farmers this harrow as a No. 1 farm implement.

H. M. Reed & Co.'s display of the different kinds of plows and other farm implements is a credit to Erie city and to the State, and we fully recommend them to the consideration of every agriculturist in the State. Randall's pulverizing harrow, in our judgment, is a grand farm implement, and should be in possession of every farmer of this State as indispensable, especially to seed sowers and grain raisers, and we recommend it to all agriculturists. The Lawrence & Chapin diamond plow is a No. 1 plow, and we consider it the leading plow of the day, and well adapted to sod, as well as stubble grounds, and more than meets our sanguine expectations. We recommend the South Bend chilled plow as worthy the consideration of all farmers, and should be given a trial before purchasing any other.

CLASS XII.—REAPING AND MOWING MACHINES.

D. M. Osborne & Co., Auburn New York, six mowers and reapers. Committee reccommend a discretionary premium for fine display of machinery, and medal for self-binding harvester.

Warder, Mitchell & Co., Springfield, Ohio, four reapers and mowers. Diploma for general excellence in every machine on exhibition.

Eagle Mowing and Reaping Machine Company, Ashtabula, Ohio, committee report valuable, because of large broad driving wheel, and convenience in arrangement of rakes.

S. W. Ellis, Erie, "Royer Reaper Guard," first premium guard, reccommended a medal.

J. F. Seiberling, Akron, Ohio, Empire mower, diploma for improvement in double cog-wheel gearing.

English & Dixon, New Philadelphia, Ohio, mower No. 2, valuable machine with guard plated with steel.

The committee report as follows: *To the President:* The committee on reaping and mowing machines, report that every member has been in the habit of attending State fairs for many years, and being personally interested in the working of machines upon their farms, have noticed the improvements from time to time. The present exhibition exceeds any in their opinion it has been their privilege to examine. A number of very valuable improvements have been made both in mowers and reapers. In lightening the draft, carrying the cutter bars, adjusting the wear and tear of pitman rods, and carrying the knives and platforms in going to and from fields, and stowing away in barn. They examined every machine entered for exhibition, and were fortunate in finding a representative present to explain the advantages and latest improvements. With so much of excellence in each, it is hard to discriminate without an opportunity of seeing them operate in the field. There being no special premiums offered, and the committee thus being stopped from awarding them, the committee confine themselves to a short expression of opinion as to the value of the several machines examined.

D. M. Osborne & Co., Auburn, New York, exhibit single mower and reaper and self-binding harvester. The committee had an opportunity of seeing the binder operate and it was all that could be desired by the most captious, binding a sheaf from two inches in diameter to eighteen inches and doing its work perfectly. In their mowers they claim an improvement, inasmuch as the shoe runs directly behind the driving wheel. The committee recommended special mention of the Champion reapers and mowers exhibited by Warder, Mitchell & Co., Springfield, Ohio; the Empire mower, exhibited by J. F. Seiberling, Akron, Ohio; of the New Warrior mower, exhibited by S. B. Ellis, Erie; of the Buckeye reaper and mower, exhibited by Altman, Miller & Co., Aibion, New York; of the combined reaper and mower, exhibited by English & Dixon, New Philadelphia, Ohio.

CLASS XIII.—THRESHING MACHINES AND HORSE POWERS.

Heibner & Sons, Lonsdale, Pennsylvania, one horse power with thresher and cleaner,	Silver medal.
Hiram Holtz & Co., East Wilton, lightning hay knife,	Diploma.

CLASS XIV.—CIDER MILLS, CHURNS, AND ARTICLES OF SIMILAR CHARACTER.

The judges awarded no premiums, but made favorable mention of the following: A cider mill, grater and press, a hand cider mill exhibited by John May, the Cooley Creamer, H. C. Aubrey's butter worker, the force pump exhibited by W. W. Green, two hydraulic rams exhibited by H. M. Reed & Co. and R. T. Williams, pumps exhibited by L. W. Olds, George Olds, A. B. Gunnison, and G. W. Low, and recommended them to the patronage of the public.

CLASS XV.—CULTIVATORS, GRAIN DRILLS, AND SOWERS.

No premiums awarded. The committee reported that the Randall Corn Harrow, manufactured by the Warrior Mower Company, Little Falls, New York, was the best implement of its kind on exhibition and recommended a special premium. The committee also reported that the farmers' favorite grain drill, manufactured by Bickford & Huffman, Macedon, New York, was a superior machine and superior to any on exhibition; also made special mention of the Paxton Grain Drill, manufactured by the Harrisburg Car Manufacturing Company, Harrisburg.

CLASS XVI.—WAGONS, CARTS, DRAYS, AND CARRIAGES.

Erie Chair Company, Erie, display of baby carriages and baby chairs,	Bronze medal.

The committee pronounced the Excelsior sleeping coach, made by this company, as the most sensible and satisfactory baby carriages yet introduced to the public. Their baby chairs are also very excellent for the purpose designed.

W. L. Booth, Concord farm wagon complete. Approved as a useful and convenient farm wagon.

Johnson Eaton, Fairview, garden wheelbarrow, first premium,	$2
Erie City Carriage Works, one four-passenger Norwich wagon,	Diploma.
Same. Three four-bow top phaetons,	Bronze medal.
Same. Display of Watertown platform spring wagons,	Diploma.
Dudley Torsion Spring Company, Erie, piano box buggy, with torsion springs,	Bronze medal.
Same. Display of torsion springs,	Diploma.
Erie Torsion Spring Company, Erie, wagon seat and pole springs,	Diploma.

H. M. Reed & Co., Erie, display of Cortland platform spring wagons,	Bronze medal.
Same. Single top phaeton,	Diploma.
Same. Two-horse family carriage,	Diploma.
Same. One-horse (express) spring wagon,	Bronze medal.
Same. One-horse farm wagon, complete,	Diploma.
Same. Display cutters and sleighs,	Diploma.
Nichols & Son, Corry, sleigh,	Diploma.
Charles Gallard, Erie, "wagon jack,"	Diploma.
Day, Prushaw & Crane, Fredonia, New York, display of leather-top one-seated phaetons,	Bronze medal.
Same. Display of platform spring phaetons,	Diploma.
C. P. Haskins, Erie, buggy and one-horse express spring wagon,	Bronze medal.
Erie City Carriage Works, single sleigh,	Diploma.
Same. Improved carriage springs,	Diploma.
Same. Display spring wagons,	Diploma.
John M. Glazier, hand-cart, first premium,	$2
Fargo & Caughey, Fairview, single top one seated piano box buggy,	Diploma.
Same. One farm wagon,	Diploma.
Gallard & Co., Erie, world's best lock lever wagon jack,	Diploma.
Moses B. Smith, Jamestown, New York, farm truck,	Diploma.
W. F. Whitney & Co., Poughkeepsie, New York, side bar spring for carriages,	Diploma.
M. Harris, Jamestown, New York, farm truck,	Diploma.
L. W. Olds, Erie, double sleigh,	Diploma.
W. P. Culver, Scranton, Pennsylvania., carriage thill coupling,	Diploma.
L. P. Holcomb, Buffalo, New York, lifting jack,	Diploma.

CLASS XVII.—MISCELLANEOUS FARM TOOLS.

Gorr, Bass & Co., wire work, diploma.

John Dodds, self operator on horse rake, bronze medal.

McCracken, Truesdale & Co., Jamestown, one farm gate, honorable mention.

Harrisburg Car Manufacturing Company, horse rake, honorable mention.

H. M. Reed & Co., set Perkins horse shoes, first premium, ... $2

Frisbee & Hamilton, Monroe, Michigan, bag holder and truck combined, honorable mention.

C. E. Brinser, Middletown, New York, grain cradle, first premium, . 2

John Henderson, Albion, New York, American common sense foot form frog supporting horse shoe, diploma recommended.

CLASS XVIII.—STEAM ENGINES AND CASTINGS.

Ruffner & Dunn, Philadelphia, tube cleaners, first premium, bronze medal.

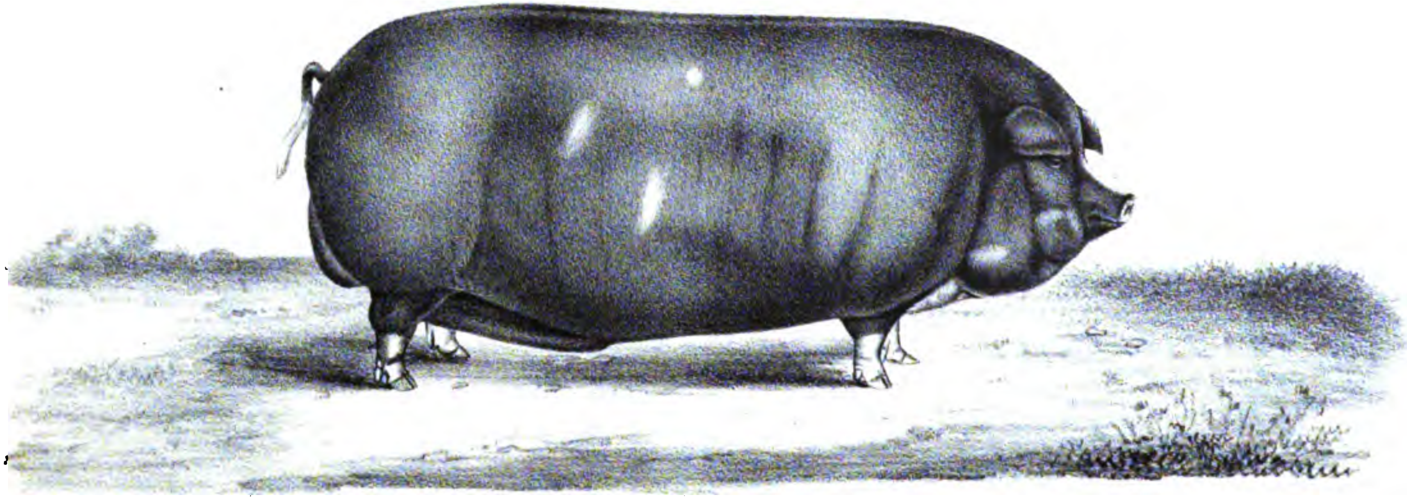
Jarecki Manufacturing Company, Erie, balance valve engine, first premium, silver medal.

Erie Tile Company, drain tile, second premium, diploma.

G. Westinghouse & Co., Schnectady, New York, agricultural engine, first premium, silver medal.

Thomas G. Morse, Erie, steam jet pump, first premium, silver medal.

C. M. O'Callaghan, Erie, Shaw's noise quieting spiral nozzles, first premium, silver medal.



STONEWALL JACKSON

Owner & Breeder, W. H. Hood, *Lock, O.*

H. M. Reed & Co., Erie, Lester saws, first premium, diploma.
Taper Sleeve Pulley Works, best pulleys, first premium, diploma.
H. M. Reed & Co., Erie, lot of large and small saws, first premium, diploma.
Phœnix Machine Works, Indianapolis, Indiana, portable Muley saw-mill, first premium, silver medal.
Skinner & Wood, Erie, portable engine, first premium, diploma.
George Zeigle, Fairview, drain tile, first premium, diploma.
Thompson Iron Works, Union city, turbine water wheel, first premium, bronze medal.
C. Aultman & Co., Canton, Ohio, portable steam engine, second premium, bronze medal.

The committee report: The duplicate 9×12 oscillating valve engine, manufactured by the Bay State Iron Works, of Erie, although not entered for exhibition, has been used by the society for driving the line shafting in the machinery building, it has given good satisfaction, and we consider it worthy of notice.

CLASS XIX.—DISPLAY OF AGRICULTURAL AND OTHER USEFUL ARTICLES AND IMPLEMENTS.

John Mars, Erie, collection of mattresses,	Diploma.
Riblet Bros., Erie, display of furniture,	Bronze medal.
P. Minnig, Erie, display of tobaccos, soaps, and teas,	Bronze medal.
C. H. Manley, Erie, display of cigars,	Diploma.
J. & J. Reynolds, Erie, display of hats, caps, &c.,	Diploma.
H. M. Reed & Co., Erie, display of Middletown silver ware,	Silver medal.
S. Sobel, Erie, display of laces, foreign and American,	Silver medal.
W. J. Fitch, Madison, Ohio, ornamental wood work,	Diploma.
Mrs. G. H. Bull, Erie, display of satins, silks, plush, and velvets,	Diploma.
H. M. Reed & Co., Erie, display of carriages, Cortland wagons, buggies, cutters, and general display of tradesmans' goods,	Bronze medal.
S. S. Marvin & Co., Pittsburgh, display of crackers and cakes,	Diploma.
Erie Chair Company, display of children's chairs and baby carriages,	Diploma.
Evans & Bennett, Erie, display of Price's perfumery,	Diploma.
C. E. Abbe, Sarasota, Florida, display of shells and natural curiosities from coast of Florida,	Diploma.
French and McKnight, Erie, display of groceries,	Diploma.

The display of millinery, by Mrs. G. H. Bull and S. Sobel, were gotten up with exceeding good taste, and, while not being confined strictly to millinery goods, comprised so large and elegant an assortment that we awarded them each the highest premium, viz: A diploma.

H. M. Reed & Co., Erie, display of agricultural implements,	Silver medal.
Erie City Carriage Works, display of carriages, buggies, &c.,	Bronze medal.

CLASS XX.—MINERALS, METALS, AND FERTILIZERS.

Saltsman & Co., Erie, Buffalo fertilizer, best phosphate on exhibition,	Diploma.
Same. Rosendale hydraulic cement,	Diploma.
Same. Display of sewer pipe,	Diploma.
Wellington Downing, Erie, best collection of mineralogical specimens, first premium,	Silver medal.

H. L. Berst, artificial mamus, best article of bone dust,	Diploma.
T. Dwight Ingersoll, Erie, collection of mineralogical specimens,	Honorable mention.
August Mehler, Erie, best artificial stone,	Diploma.
C. H. Chapin, Wattsburg, best plow metal,	Diploma.

CLASS XXI.—LEATHER AND ITS MANUFACTURES.

A. B. Tracy, Mayville, New York, check supports,	Diploma.
J. Boland, Conneautville, Pennsylvania, three sides harness leather, second premium,	$2
Same, three sides upper leather, first premium,	5
Same, six calf skins, first premium,	5
H. M. Reed & Co., carriage whips,	Diploma.
J. Rife & Bro., Middletown, Pennsylvania, six sides long harness leather, first premium,	Diploma.

CLASS XXII.—BUTTER, CHEESE, AND HONEY.

H. Williams, Wookcock borough, Limberger cheese, first premium,	$20
John Fuller, Harmonsburg, Pennsylvania, three cheese, second premium,	15
George F. Webb, Rundeltown, Pennsylvania, three cheese, third premium,	10

Sweepstakes Cheese.

John Cole, Venango borough, Pennsylvania, first premium,	$20
Excelsior Cheese Factory, Erie, second premium,	10
J. McGownell, Waterford, best ten pounds honey,	5
D. Videto, North East, second best ten pounds honey,	3
Henry Kridder, Fairview, best five pounds honey,	3
D. Videto, North East, best bee hive,	2
Mrs. John Burton, Erie, best three rolls of butter,	5
Lyman A. Burgess, North East, second best three crocks butter,	3
D. Videto, excelsior honey extractor, first premium,	Diploma.

CLASS XXIII.—FLOUR AND INDIAN MEAL.

J. B. Crouch & Co., of Erie, were the only exhibitors in this class. The committee made no awards.

CLASS XXIV.—GRAIN AND SEEDS.

W. W. Reed, Erie, one bushel bag Lancaster red wheat, first premium,	$5
Frank Voght, Erie, samples of hops, first premium,	2
A. J. Ebersole, Harbor Creek, one bushel timothy seed, first premium,	2
H. H. Russell, Belle Valley, Pennsylvania, one bushel white wheat first premium,	3
J. W. McDowell, Dicksonburg, Crawford county, Pennsylvania, best and largest variety of wheat, not less than one half bushel each, first premium,	5
Same. Bushel of oats, first premium,	2
Same. Bushel of barley, first premium,	2
Same. Bushel of buckwheat, first premium,	2

Same. Best and largest display of grain not less than six varieties, first premium,	$10
Same. One half peck pea seed, first premium,	2
Same. Sample of newly introduced grain, first premium,	2
D. Videto, North East, Pennsylvania, bushel of clover seed, first premium,	5
H. Shattuck & Son, Erie, bushel of yellow corn, first premium,	2
John Stranahan, Harbor Creek, bushel of potatoes, (early rose,) first premium,	2
J. F. Caughe, Erie, bushel of rye, first premium,	3
Michael Eckendorf, Wesleyville, one peck pea seed, first premium,	2
Same. One half peck parsnip seed, first premium,	2
Same. Bushel white flint corn, first premium,	2
James Hallenan, Erie, quart of onion seed, first premium,	2
Same. One half peck cucumber seed, first premium,	2
W. W. Eaton, Fairview, one half bushel sweet potatoes, first premium,	2
J. R. Rife, West Fairview, Pennsylvania, one half bushel seedling potatoes, two years, first premium,	2
James Hallenan, Erie, one half peck sugar beet seed,	2
J. R. Rife, Fairview, seven varieties seedling potatoes, one half peck of each, first premium,	5

CLASS XXV.—Collection of Agricultural Products.

T. Sprague, North East, best collection exhibited by a union of six different persons, T. Sprague, H. Churchill, J. H. Reed, James Reed, Joel Reed, H. T. Sprague,	10
J. W. McDowell, Dicksonburg, six bushels rye, first premium,	10
Same. Six bushels oats, first premium,	6
Same. Two bushels timothy seed, first premium,	10
Same. Exhibit composed of all or any of foregoing grain seeds, &c., first premium,	10
D. Videto, two bushels clover seed, first premium,	10
H. T. Sprague, collection of peas, first premium,	10
Six Cumberland county farmers, six bushels potatoes, first premium,	8

CLASS XXVI.—Beet and Sorghum Sugar Machinery.

No Entries.

CLASS XXVII.—Vegetables.

W. W. Eaton, Fairview, twelve ears white corn, first premium,	$1
A. W. Roberts, Concord, Pennsylvania, three Maur squashes, first premium,	1
Same. Twelve red onions, first premium,	1
Same. Twelve carrots, first premium,	1
Same. Twelve parsnips, first premium,	1
Henry Neimeyer, second best display of vegetables, tibrty varieties,	5
Artemas Martin, twelve peppers, first premium,	1
William Moorhead, Moorheadville, three water melons, first premium,	1
Same. Three green fleshed nutmegs, first premium,	1
Same. Three yellow fleshed nutmegs, first premium,	1
H. Shattuck & Son, twelve beets, first premium,	1
Same. Six mangell wurtzells, first premium,	1

Charles Gallard, Erie, six stalks rhubarb, first premium,	$1
H. J. Thurber, Erie, Hubbard squash and vine, first premium,	2
James Hallenan, Erie, best display vegetables,	10

CLASS XXVIII.—CORDIALS, CIDER, &c.

William Fairweather, McLean, Pennsylvania, three bottles of cider, first premium,	$3
George Doll, West Millcreek, two gallons cider vinegar, first premium,	3
C. F. Sweet, Edinboro', one gallon blackberry wine, first premium,	2
Mrs. Isaac Wolf, home-made currant wine, first premium,	2
S. M. Hertzler, Cumberland county, Concord wine, first premium,	3
Same. Delaware wine, first premium,	3
Same. Isabella wine, first premium,	3

CLASS XXIX.—FRUITS.

Albert Russell, Belle Valley, three varieties fall pears, first premium,	$3
Same, two branches plums in alcohol,	Honorable mention.
W. W. Eaton, Fairview, six varieties grapes, first premium,	5
Same, Concord grapes,	Honorable mention.
Same, sample of grape training, first premium,	5
Same, grapes grown in cold vinery, first premium,	3
P. Osborne, Girard, five varieties winter apples, first premium,	5
Jessie Jones, Erie, ten varieties fall apples, first premium,	6
George Doll, West Mill creek, twelve prunes,	2
R. M. Bonnell, Weslerville, ten varieties fall apples, second premium,	3
H. T. Spragne, Erie, five varieties winter and fall pears, first premium,	4
Same, three varieties same, second premium,	2
Mrs. C. P. Sprague, Erie, arranged basket pears, first premium,	6
C. A. Leet, Moorheadville, arranged basket quinces, first premium,	5
Same, fifteen bunches grapes, first premium,	10
Same, Catawaba grapes,	Honorable mention.
Same, Delaware grapes, four bunches, first premium,	1
Same, half peck any variety, first premium,	2
E. F. Moorhead, Moorheadville, five varieties winter apples, second premium,	2
John Finch, half peck Delaware grapes, first premium,	2
J. J. Ebersole, Harbor Creek, largest collection apples, second premium,	5
J. H. Lyon, Willoughby, Ohio, half peck Isabella grapes, first premiums,	2
Same, half peck Concord grapes, first premium,	2
Same, half peck Catawba grapes, first premium,	2
Same, four bunches Isabella grapes, first premium,	1
Same, four bunches Concord grapes, first premium,	1
Same, four bunches Catawba grapes, first premium,	1
Same, six varieties peaches, first premium,	4
Same, largest collection peaches, first premium,	Diploma.
Same, three varieties peaches, second premium,	2
M. Mehl, Erie, three varieties summer pears, first premium,	2
Same, half peck Diana grapes, first premium,	1
Same, half peck Rebecca grapes, first premium,	2
Same, twelve gages, first premium,	3
T. S. Hubbard, Fredonia, New York, two bunches grapes, new hardy kind, first premium,	2

James A. Nelson, Indian Run, best collection apples,	$10
Same, ten varities fall apples, first premium,	5
Same, ten varieties peaches, first premium,	3
Same, best arranged basket peaches,	5
Same, general assortment, fruit all kinds, second premium,	10
American Drier Company, Chambersburg, evaporated and conserved fruits, berries, and vegetables, first premium,	3
C. A. Leet, Moorheadville, largest and best variety grapes,	Diploma.

Committee report: The portable fruit drier seems to do its work admirably, and can be commended for cleanliness, economy, and adaption for its peculiar work.

CLASS XXX.—Flowers and Designs.

Berst Bros., Erie, best twelve varieties, plants and flowers, first premium,	$4
Same. Best six varieties plants and flowers,	3
Same. Second best collection leaf plants,	3
Same. Best collection geraniums,	2
Same. Best collection tuberoses,	2
Same. Best collection cut roses,	2
Same. Second best pair round bouquets,	2
Same. Second best pair flat bouquets,	2
Same. Second best basket with flowers,	2
Same. Second best fancy basket with flowers,	1
H. S. Sprague, Erie, second best display of evergreens,	5
H. A. Neimeyer, Erie, second best twelve varieties, one each, flowers,	3
Same. Second best six varieties flowers,	2
Same. New specimen plant, not before shown,	
Same. Best collection leaf plants,	5
Same. Bedding and out-door decoration for garden,	5
Same. Best collection of pinks,	2
Same. Best collection of pansies,	2
Same. Best collection of gladolias,	2
Same. Best collection of fuschias,	2
Same. Best collection of heliotropes,	2
Same. Best collection of dahlias,	2
Same. Best collection of petunias,	2
Same. Best collection of asters,	2
Same. Best collection of aloes and cactus,	2
Same. Best pair of round and hand bouquets,	3
Same. Best flat and round hand bouquets,	3
Same. Best round bridal bouquets,	3
Same. Best collection bouquets, pyramid form.	5
Same. Best basket with flowers,	2
Same. Best fancy basket with flowers,	2
Carr Bros., Erie, nursery collection, first premium,	10
James A. Nelson, Indian Run, Pennsylvania, display of evergreens, twenty-five kinds,	10
Berst Bros., new specimen flower, not before shown,	2

CLASS XXXI.—Stoves and Tinware.

Chicago & Erie Stove Company, display of stoves, and portable ranges,	Silver medal.

C. Flickinger, Erie, display of heating stoves, . Complimentary mention.
H. M. Reed & Co. display parlor heating stoves, honorable mention and diploma recommended.

CLASS XXXII.—GLASS, CUTLERY, LAMPS, &c.

Troop & Son, Harbor Creek, Pennsylvania, half dozen elm bushel baskets, first premium,	$1
Riblet Bros., Erie, bedstead, first premium,	2
Same. Bed and bedstead, first premium,	5
F. F. Adams & Co., Keystone washing machine, first premium,	1
Same. Keystone clothes wringer, first premium,	1
Mount Vernon Lantern Works, Mount Vernon, Ohio, display of lamps and lanterns,	Bronze medal.
Erie Washer Company, Waller washer,	Favorable mention.
Union Manufacturing Company, Erie, Union noiseless spring bed, first premium,	1
William E. Hulett, Unionville, Ohio, flour barrel, first premium,	1
M. N. Lovell, Erie, Lovell family washer,	Favorable mention.

CLASS XXXIII.—CLOTHS, LINENS, BLANKETS, SHIRTINGS, &c.

J. W. McDowell, Dicksonburg, ten yards linen diaper,	Diploma.
Same. Linen shirting, first premium,	$3
Same. Plain flannel,	Diploma.
Mrs. F. W. Koehler, Erie, rag carpet, first premium,	3
O. R. Sly, pair home-made woolen socks,	Diploma.
Same. Pair home-made cotton socks,	Diploma.

CLASS XXXIV.—QUILTING, NEEDLEWORK, EMBROIDERY, &c.

Mrs. P. Arbuckle, Erie, one picture, beadwork, first premium,	$1
Miss Agnes Sterret, Erie, display of needlework, first premium,	3
Miss Mason, Erie, one toilet set, first premium,	2
Same. Embroidered bracket, first premium,	1
Inez Olds, Erie, lace handkerchief, hand-made, first premium,	1
Mrs. D. O. Nason, North East, point lace barbs, first premium,	2
Miss Mary Blosser, Erie, needlework picture, first premium,	1
Mrs. H. Keene, Erie, disblay of beadwork, first premium,	2
Mrs. H. Webster, Titusville, bead pin cushion,	1
Miss C. M. Zimmerman, Erie, display of handkerchiefs, first premium,	3
Mrs. T. H. Quigley, Erie, embroidered skirt,	1
Rosine Walda, Erie, basket quilt, first premium,	1
Mrs. A. M. Compton, white quilt, first premium,	2
Mrs. J. R. Saltman, Erie, three silk bed quilts, first premium,	3
Same. Two table covers on cloth, first premium,	2
Miss Hattie Barr, calico bed spread, first premium,	1
E. E. Custard, sofa pillow, first premium,	1
Same. Silk embroidery,	1
Mrs. P. D. Faulkner, Erie, pair of slippers, first premium,	2
Miss S. E. Kulbourne, Honiton lace handkerchief,	1
Same. Point lace handkerchief,	1
Miss Lizzie Johnson, Erie, embroidered towl, first premium,	1
Same. Night gown, (bobinet work,) first premium,	1
Mrs. Lebling, Erie, embroidered collar, first premium,	1

Marion P. Booth, Erie, bracket lambrequin, first premium,	$1
Mrs. J. Abell, Erie, embroidered pin cushion and watch case,	1
Same. Childs dress, first premium,	3
Mrs. Ross Weaver, Erie, log cabin quilt, first premium,	2
Miss Annie L. Wilson, Edinboro', blocks of patchwork, first premium,	1
Mrs. B. F Sloan, Erie, embroidered sewing chair, first premium,	1
Mrs. Thomas McKee, pillow shams,	1
Mrs. Thomas McConkey, Erie, embroidered foot rest,	1

CLASS XXXV.—Knitting, Crochet, Skile Work.

Miss H. H. Marsh, E. Springfield, one hair wreath, first premium,	$2
Same. One zephyr toilet cushion and watch case, first premium,	1
Mrs. James Curry, Erie, one wax cross, first premium,	1
L. J. Barr, Erie, four moss pictures, first premium,	2
Mrs. W. J. Scott, Mill Village, crochet tidy, first premium,	1
Same. Collar tatting, first premium,	1
Mrs. E. D. Carter, Erie, knitted shawl, second premium,	1
Mrs. E. Mayfield, Erie, crochet shawl, shell stitch, first premium,	2
Miss Mason, Erie, crochet scrap bag, first premium,	1
Miss Blanche Tanner, Erie, four crochet tidies, first premium,	2
Miss Inez Olds, Erie, knitted shawl, first premium,	2
Mrs. Orvile Johnson, Erie, crochet basket, first premium,	1
Mrs. Clara Barnes, Findley's Lake, New York, hair work, second premium,	1
Same. Gents' knit scarf, first premium,	1
Miss Orenda Jane Martin, Erie, fancy basket of everlasting flowers, first premium,	1
Miss Lillie E. French, North East, cross on perforated card board, first premium,	1
Mrs. William C. Keeler, knit spread, (white,) first premium,	2
Mrs. G. S. Warren, Erie, knit bed spread, second premium,	1
Mrs. John Fisher, Erie, knit black silk lace, first premium,	1
Same. Three handkerchiefs, first premiums,	1
Miss Rose Whitney, Erie, thread tidy, first premium,	1
Mrs. Titus F. Berst, Erie, zephyr, first premium,	1
Mrs. T. Hallowfield, Erie, zephyr flowers, first premium,	2
Miss C. M. Zimmerman, Erie, knitted shawl, first premium,	2
Miss Anna Zeller, Lock Haven, lace embroidered tatting, first premium,	2
Miss L. H. Skinner, Erie, knitted crib spread, first premium,	1
Same. Crochet collar, first premium,	1
Mrs. J. Abell, Erie, chair tidy and arms, first premium,	1
Mr. P. D. Faulkner, Erie, afghan, (crochet and embroidered,) second premium,	1
Mrs. A. T. Loomis, Erie, afghan, first premium,	2
Mrs. G. H. Bull, Erie, artificial flowers,	2
Mrs. Doctor Ingersoll, Erie, wax work, first premium,	2
Mrs. H. Keene, Erie, moss pictures, first premium,	2
Mrs. Thomas McConkey, Erie, knitted sontag, first premium,	1
Same. Knitted slipper, first premium,	1
Same. Crochet hood, first premium,	1
C. H. Austin, two vases ornamental grasses, first premium,	1
Miss Susan Meyers, deaf mute, tidy, first premium,	1

CLASS XXXVI.—BREAD, CAKES, PASTRIES, AND MEATS.

Martin Mauer, Erie, five varieties of bread, first premium,	$2
Same. Two loaves home-made bread, first premium,	2
Same. Best and largest display of bread,	2
Miss Tillie Winkle, rusk, first premium,	1
Mrs. Thomas McConkey, Erie, cup cake, first premium,	1
Martin Mauer, Erie, fruit cake, first premium,	1
Same. Gold cake, first premium,	1
Same. Sponge cake, first premium,	1
Same. Lady cake, first premium,	1
Same. Silver cake, first premium,	1
S. S. Marvin & Co., Pittsburgh, best variety of small cake,	1
Mart Mauer, Erie, best display of cakes,	2
Same. Best display of assorted candies and confections,	5

Report of committee: We would make special mention of the pancake flour exhibited by S. S. Marvin & Co., of Pittsburgh.

CLASS XXXVII.—PRESERVES AND SPICED PRODUCTS.

Mrs. D. Hawk, Erie, best two jars of peaches,	$1
Mrs. H. S. Jones, Erie, second best display of pickles, in ten jars,	3
George Doll, West Millcreek, best one gallon apple butter,	1
Miss E. C. Eaton, Fairview, best two jars quince jelly,	1
Miss Fannie Reed, Erie, best two jars pickled cucumbers,	1
Mrs. L. W. Olds, Erie, best two cans air-tight peaches,	1
Mrs. H. L. Berst, Erie, best display of pickles, ten jars,	5
Mrs. C. H. Austin, Erie, best two jars of pears,	1
Same. Best two jars strawberries,	1
Mrs. Hobart Hogan, Erie, second best display preserves and jellies,	3
Mrs. J. W. Shenk, Millcreek, best three jars preserved peaches,	1
Mrs. John Abell, Erie, best display of preserves and jellies,	5
Mrs. E. W. Reed, best two jars spiced peaches,	1

CLASS XXXVIII.—FINE ARTS AND PENMANSHIP.

Paul Kreutzpointer, Erie, five specimens industrial drawing, first premium,	$3
Lester J. Barr, specimen penmanship, map of farm survey, first premium,	2
Miss Augusta Densmore, McLane, display of water colors, first premium,	3
Same. Flowers in water colors, first premium,	3
Miss Josephine Swan, Swanville, pen and ink sketch, second premium,	1
W. A. Morand, Erie, best display in plain and colored photographs,	Bronze medal.
Same. Portraits in crayon, first premium,	3
Miss Anna L. Zimmerly, Erie, water colored landscape, first premium,	3
Same. Animal painting in oil, first premium,	3
E. H. Caughey, Erie, two portraits, first premium,	3
Frank Fairbairn, Erie, specimen of crayon, first premium,	3
Miss Carrie Halcott, Erie, display of monochromatic drawing, first premium,	3
Miss Josephine Swan, Swanville, Pennsylvania, landscape painting in oil, first premium,	3

CLASS XXXIX.—SILVERWARE, PIANOS, SEWING MACHINES.

R. M. Wanzer, Buffalo, New York, best double stitch sewing machine.
Burdett Organ Company, Erie, best church and parlor organ.

CLASS XL.—MISCELLANEOUS ENTRIES.

The committee report "that there were sixty-seven entries, some of which were improperly classified. As several of the articles at former exhibitions had received the highest premiums this society can bestow, the committee felt it their duty to simply make honorable mention. The committee made honorable mention of the following: Ross R. Royer, West Millceek, case insects; Henry H. Colberg, Erie, flower pots prepared by a patent process in all colors; P. S. Ensworth, Waterford, contrivance for showing advertisements; Charles Gallard, Erie, for manner of putting up rail fence; P. G. Winkler, Erie, piano model; W. H. Sewell, Erie, fire kindler; G. R. Knight, Erie, painters' cart; Gustave Boyer, Erie, model marine engine; W. L. Leonrad, Westfield, New York, specimen of sign painting; George E. Doolittle & Co., Erie, automatic dress pleater and patent wire binding; L. W. Olds, Erie, bear skin robe; S. Sobel, Erie, exhibition of carpet stretcher.

Committee granted diplomas to the following named exhibitors, viz: A. O. Coryell, Brocton, New York, picket fence; Lee's Patent Metallic Bill File Company, for metallic bill file or document holder; W. C. Olds, Erie, Eureka sap spiles and sap bucket and cover; John Hafer, Bedford, Pennsylvania, portable fence; H. K. & B. F. Thurber, New York city, display Higgins' Eureka salt; D. O. Nason, North East, carpet sweeper; A. Acheson, Erie, model of a new device for warming houses; Union Manufacturing Company, Erie, folding sewing table; Mrs. E. A. Dumars, Erie, Lincoln's patent fringing machine and Victoria plaiter; Miller & Hine, Duke Center, self-measuring funnel; E. D. Dent, Jamestown, New York, revolving farm gate; Reed & Watt, North East, extension tables.

The committee granted bronze metals to the following: Coates & Cleveland, Erie, Little Giant water motor; American Fusee Company, Erie, display safety and sanative matches. The committee would cheerfully award a bronze medal; but aware of the fact that such award was made last, believe that special commendation of these everyday articles used in our homes would be a higher award, would unhesitatingly recommend these matches as being all that is claimed for them, safe and sanative; to F. F. Adams & Co., Erie, for their manufactures of a number of valuable and useful inventions, viz: Complete clothes wringer, step and extension ladders, excelsior and reversible clothes horse, hard wood wainscoating, bed springs, novelty brush-holder, and hat and coat racks. We award a bronze medal to T. Hallowfield, Erie, fine display of his skill as a taxidermist.

In the magnificent collection of beautiful birds, we award a bronze medal to S. A. Brew, Bellefonte, Pennsylvania. For water governor for water wheels, for its simplicity, durability, and practability, a bronze metal. To D. H. Whittmore, of Worcester, Massachusetts, the inventor of four ingenious inventions, viz: Union Apple Parer and Slicer, Little Favorite Apple Parer and Slicer combined, Bay State Apple Parer and Slicer combined, and Little Favorite Potato Parer and Double Slicer, a diploma.

DRILLS.

By THOMAS G. JANVIER, *Superintendent Machinery, Agricultural Department, late Centennial Exposition.*

The object of this article is not to say which is the best and most desirable drill for the farmer to purchase; neither is it to give a full description of all the parts and attachments which compose the same. But to give, under one head, a brief and concise account of two of the most vital and important parts, as contained in some of our leading drills, namely: The feed arrangement and the method of changing quantity.

Among the many labor-saving machines, the drill is certainly one of very great importance, and the experience of the best farmers has proven that drilled wheat yields at least ten per cent. more per acre than wheat sown broadcast and harrowed in. Drilled wheat is put in at a uniform depth, is evenly and perfectly covered, and is placed in the most advantageous position for germinating, being in a gutter, with a ridge of earth on each side, which is pulverized by the action of frost, and carried down by the rain and wind, thus covering, from time to time, the roots as they may become exposed, at the same time imparting to the rootlets a large proportion of the fertilizing qualities of the soil. The roots are thus well protected, become strong and healthy, and are not so liable to be injured by drought or by the action of frost as wheat sown broadcast. Drilled wheat all germinates at the same time, ripens earlier, and with great regularity and uniformity, and the heads are larger and much better filled. Then, again, time is saved, as two acres can be put in with the drill in the time it would require to sow and harrow in one. There is also a saving in seed wheat, as one and a half bushels drilled will give as large a yield as two bushels sown broadcast. The gain per acre, from all causes, of drilled over broadcast seeding ranges from two to three dollars per acre, so, if we take the mean, or two dollars and a half, we see the farmer will save the price of a drill in one season in seeding thirty-two acres with the drill. The following is from the report of the Agricultural Department for 1870: "In many instances the exemption from winter killing is evidently due to the use of the drill, which plants the grain more deeply and uniformly than the brush or harrow used in broadcast sowing. Abundant testimony has, this spring, been furnished to prove that the wheat drill is worth many millions to the agriculture of the county."

Regularity and Uniformity of Feeding.

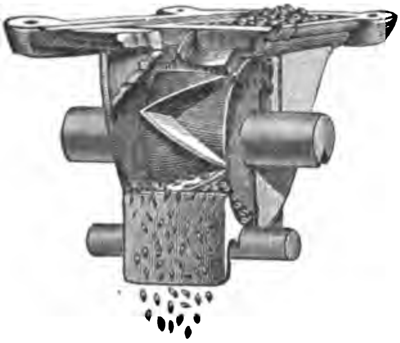
The first question a farmer will ask about a drill is: Will it sow the same amount of grain at all times and under all circumstances, sow the same quantity per acre when drilling on a side hill and when going up or down hill as when on level ground? This depends entirely on the feed arrangement. There are a number of feed wheels, rollers, &c.; but it will be necessary to mention and explain but a few of the most important and reliable ones.

Willoughby.

The grain feed in this drill is made entirely of rubber, and is so arranged that it cannot choke. Two rods of seven eights inch square iron are made to revolve towards each other by means of pinions, and have turned bearings fitted in bored boxes. On these rods are fitted corrugated rubber rollers which form a most admirable force feed. The quantity is governed by means of slides and regulators, causing a constant and regular flow of seed. The index shows plainly the amount to be sown per acre, and can be set to sow from one quarter to two and a half bushels, as may be desired.

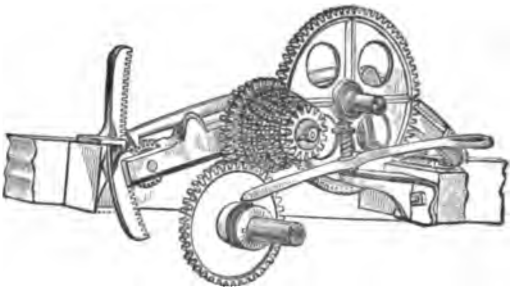
Farmer's Friend.

The feed wheel or distributor is represented with a section of the cup in which it revolves, removed, so its construction and operation can be more fully understood. It has on its surface eight zig zag ribs which form as many cavities in which the grain is carried out by the revolutions of the wheel. These diagonal ribs work in opposite directions, and yet work together, to force and carry the grain with every part of their surface toward the mouth of the cup. The ribs do not serve as agitators, but as carriers for the grain, which occupies the cavities formed by them, and the space beneath in the cup, in its passage around the wheel, and are so formed that at no point is the discharge of grain obstructed.



Double Force Feed.

The quantity per acre is regulated by means of a series of gear wheels fastened in a cone, which is shown with a section of the frame, and all parts in connection with it. The cone is between two gear wheels, the lower one being on the shaft that carries the feeder. To make a change, the lever is pressed down in the rear, which unlocks the ratchet in front, and raises the cone, when the wheel on the main shaft is moved by a lever into the wheel of the cone that will sow the desired quantity, which is indicated by a ratchet plate under the end of the lever. The result of this change is to cause the wheel on the feed shaft, to run faster or slower, thus sowing more or less grain as may be desired. By this method of changing quantity, great regularity and exactness are obtained.

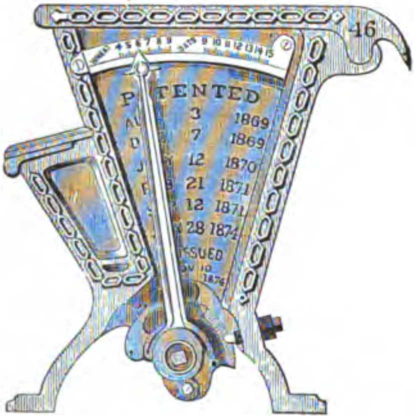


Cone Gearing.

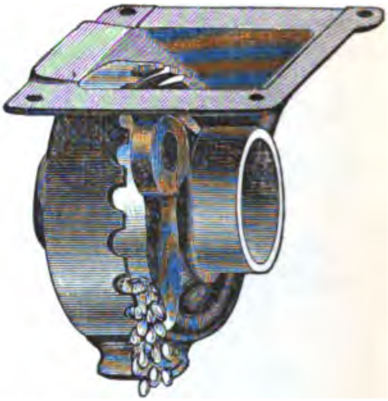
Buckeye.

The feeder in this drill consists of a feed cup, in which there is placed an adjustable revolving disk with teeth on the side near the edge. These disks are all fastened on the feeder shaft, and moved laterally to vary the distance or space between them and the sides of the feed cups. All being fastened on the same shaft, each one is moved exactly the same distance, causing a uniform change in all the feeders.

CHANGE OF QUANTITY.



VIEW OF HOPPER END WITH INDICATOR.

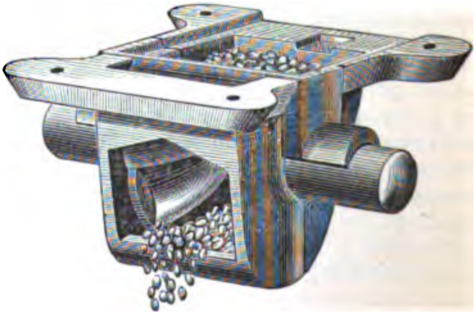


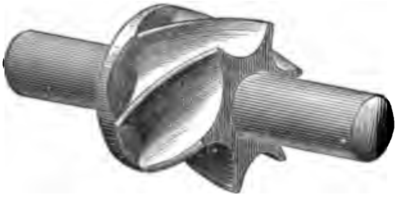
VIEW OF FEEDER SET FOR SMALL QUANTITY.

The quantity sown is regulated by a very simple device at the end of the hopper, consisting of a cam fastened on the end of the feed shaft, to which is attached the indicator arm or lever. This, when moved, operates the feed shaft and feeders in a lateral direction. There is a scale on the end of the hopper, with figures indicating the different quantities of grain to be sown per acre. To make a change, the indicator is moved to the figures indicating the desired quantity, and the thumb nut tightened. In this way you can make a quick change from one quantity to another, whether one pint or one peck.

The McSherry.

In this drill is used the spiral feed wheel, washer and cup. It consists of an iron spiral shaped wheel with six ribs, and between the ribs six pockets for carrying up the grain, as shown by the accompanying cuts. The ribs being spiral, give a positive feed, even and regular at all times and under all circumstances; and before one rib has ceased discharging at one side, the next rib, carrying up an equal amount of grain, begins to discharge at the other side. This action is kept up continuously, one rib discharging after





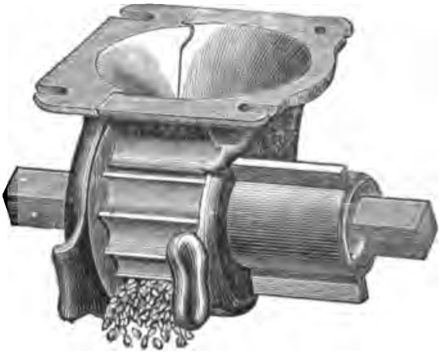
another with the regularity of a clock, insuring an even and regular flow of seed at all times, and making the bunching of grain an impossibility. To prevent the breaking or mashing of grain, there is a washer at the end of the feed wheel, and revolving with it. The mouth of the cup, or opening, is much higher than the bottom of the cup, thus removing the pressure of the grain from said opening, and preventing the loss of grain while driving with a full box. The change from one quantity to another is made by means of loose gear wheels. The openings of the feed cups are always the same, and the cog wheels being correct once, it is impossible for them to vary the next time they are used. The change is so simple and readily made that it is not necessary to explain it.

Centennial or Farmers' Favorite.

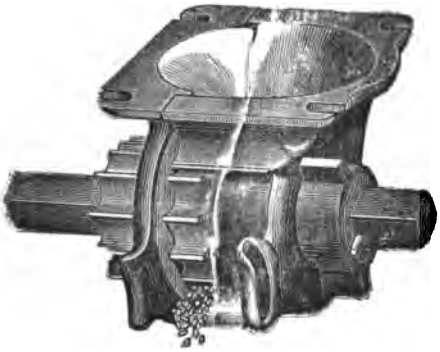
This drill is constructed with a double force feed distributor, and with different runs or openings for fine and course grain. The manner of delivering the seed is from the internal flange of the feed wheel. This flange serving as a bottom for the distributor, the grain rests upon it, consequently, when the wheel is revolved the feed travels exactly with it, thereby insuring the flow of grain to be in a steady and unbroken stream. The two casings, between which the feed-wheel revolves, form the outer walls of a complete measuring channel or throat, through which the grain is carried by the rotary motion of the wheel, thus providing the means of measuring the seed with great accuracy. The quantity per acre is regulated by simply increasing or decreasing the speed of the feed-wheel, which is done by placing a larger or smaller gear-wheel on the end of the stud shaft that drives the distributors. This change is easily and quickly done, and is positive and accurate.

Hoosier.

The accompanying cuts represent the feed arrangement of this drill. Underneath the hopper is a series of fluted feed-rolls revolving within the feed cups. These rolls are attached to a square shaft that can be moved longitudinally, either way, by means of a small lever. In the left hand side of each cup there is a scalloped ring, the scallops of which fit closely into the flutes or grooves of the feed-rolls, but allow the rolls to pass through when the feed-rod, to which they are attached, is moved. A hub or follower passes through the right hand side of each feed-cup, and is also attached to the feed-rod in close connection with the feed-roll. These followers do not revolve, and are provided with two flanges, one on top, the other along the side, which act as cut offs to prevent the flow of seed from that portion of the cups not occupied by the feed-rolls. As the feed-shaft



View of Feed-Wheel Set for Large Quantity.



VIEW OF FEED WHEEL SET FOR SMALL QUANTITY.

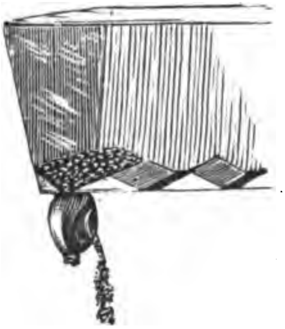
revolves, it also revolves the fluted wheels, forcing out the grain and giving a regular and uniform feed There is just space enough left between the rolls and the bottom of the cups to prevent the cracking and breaking of grain.

The quantity of grain is regulated by moving the feed rod to the right or left. When it is moved to the left, the feed rolls pass through scalloped rings, that portion of them extending through being removed the from contact with the grain. The amount of feed roll surface exposed to the grain being in this way reduced, the quantity of grain forced out will be correspondingly reduced. When the feed rod is moved to the right or left, the feed rolls and followers are all moved simultaneously, and just the same distance, thus increasing or decreasing at pleasure, and with great uniformity and regularity, the quantity of seed discharged, by bringing more or less of the feed roll in contact with the grain in the cups. These changes can be made when the hopper is full of grain or nearly empty, when the drill is in motion or at rest. The indicator is in the rear of the hopper, and attached directly to the feed rod. It has four points, one each for wheat, oats, barley, and flax, which pass over a graduated scale that has the desired quantity of grain to be sown plainly marked on it.

Empire.

The feed run and hopper bottom of this drill are shown in cuts 1 and 2. Fig. 1. represents the hopper bottom, which consists of triangular blocks of wood inserted in the space between the distributors in such a manner that a complete hopper is formed from the top of the seed box to the point at the bottom of the run, where the grain is raised to the discharging aperture, thus offering the least possible resistance to the downward movement of the grain, and guiding with great certanty each and every kernel.

FIG. 1.



HOPPER BOTTOM.

FIG. 2.

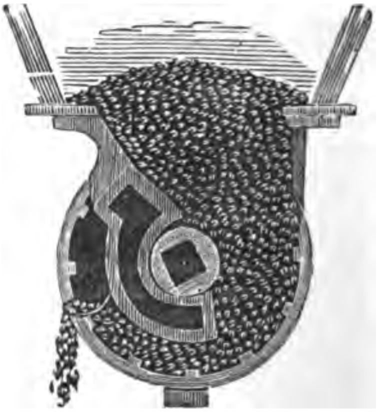


Fig. 2. represents the inside view of the feed run, or the manner of conveying the seed from the seed box, through the hopper bottom into the disc distributor and discharging it in plain view of the operator into the conductors below. The distributor is a rotating disc, having a flange on the outer circumference, provided with ribs or starts, as shown in the cut. This disc, as it rotates, carries the seed surely and evenly through a channel, by which means a constant and steady discharge is secured. It possesses not only the power of carrying, but also of drawing the seed through.

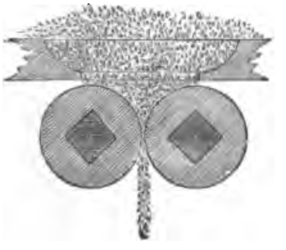
The quantity per acre is regulated by means of change gear wheels, or pinions, and when a certain size gear is on it, will always sow the same amount.

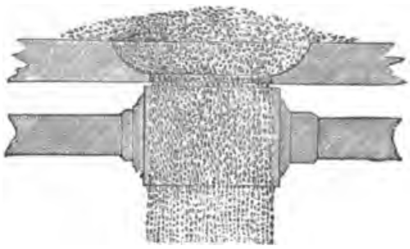
Champion.

The seeding arrangement of this drill consists of a series of face or casing plates attached to the grain box through lugs or ears, and provided each with a vertical feed wheel and a seed cup, or secondary hopper, the latter open at its upper end for receiving the grain from the feed box. The side of the wheel adjoining the face plate has a circular groove or channel formed in it, which receives the grain from the cup, and conveys it, as the wheel is rotated, to the discharge opening. The wall of this channel has a series of indentations or pockets in it, which serve to give a positive movement to the grain, and prevent crushing or breaking. These indentations are very slight countersinks, as the wall of the channel is relied on to give force to the feed. The quantity is regulated by gear wheels, ranging from three pecks to three bushels by four quart changes.

Hagerstown Drill.

The accompanying cuts give an end and side view of the feed of this drill. It consists of an inelastic or metal roller, and an elastic or gum roller, revolving towards each other, and drawing down out of the hopper a regular and even layer of grain. The metal roller will never, under any circumstances, admit of more than one layer of grain passing through at the same time, thus giving a feed of great regularity and uniformity.

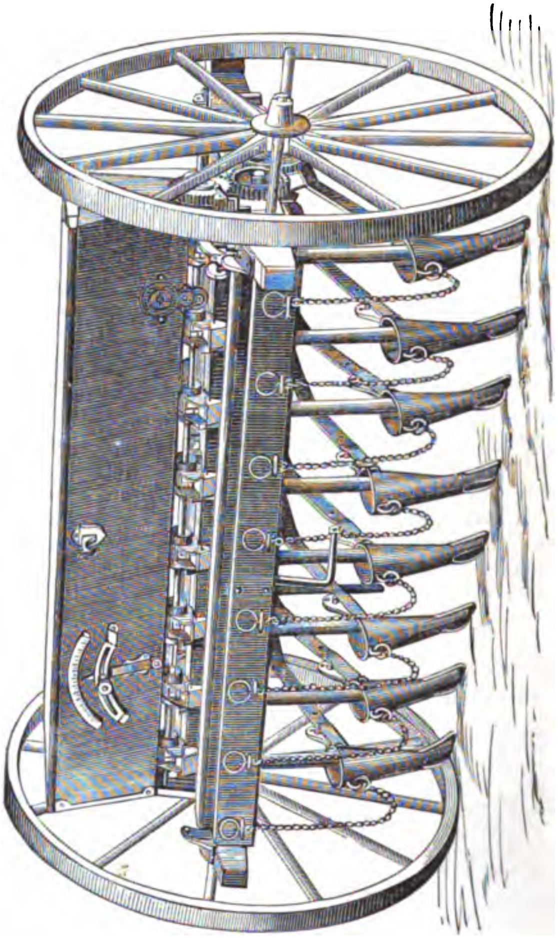

End View.


Side View.

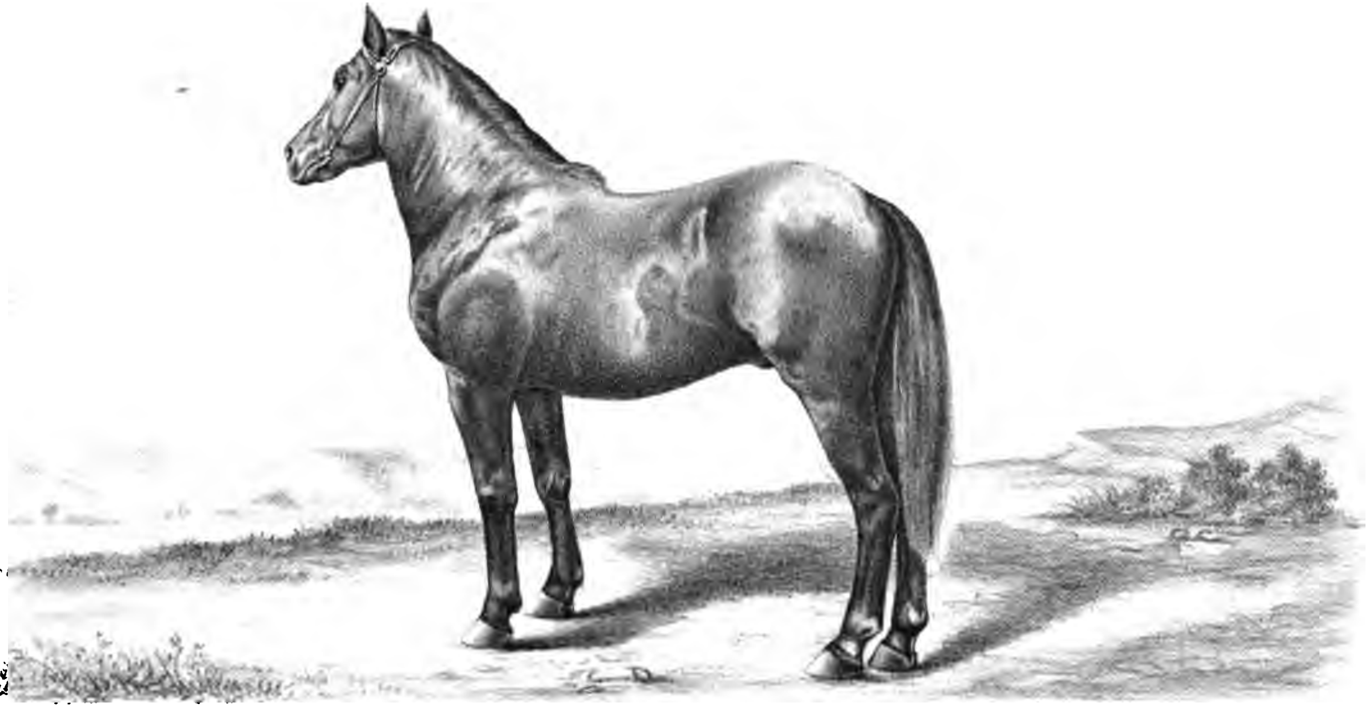
The quantity to be sown is governed by the length or amount of rolling surface of these rollers coming in contact with the grain, and is regulated by means of an iron slide, which can be moved in a few seconds to sow more or less in any quantity, from one peck to two bushels.

The Paxton.

This drill has a positive force feed, and will not choke with straw, white caps, and other foreign matter sometimes found in grain. The feed consists of receiver cup and feed roller. The bearings in the former are bored out true and smooth, and, on the latter, are turned to fit, exactly, those in the cup. The roller is longer than the cup, and has in the middle a grooved surface forming nine pockets or carriers running parallel to near its center, at which point nine other pockets begin, and have a spiral direction to the side of feed cup, thus securing a continuous and even flow of seed. The rollers are fastened to a shaft, which moves laterally through the feed cups, increasing or decreasing the amount of feed, according to the direction moved. By this arrangement no breaking of grain occurs, as no rough surfaces come in contact with it. The quantity per acre can be changed, whether the drill is in motion or not, by simply loosening a knob screw holding a lever indicator in place on a radial scale on rear side of hopper, showing bushels and fractions of same. The indicator is then moved to the desired quantity, and the screw tightened.



THE PAXTON.



LOUIS PHILLIPE *(PERCHERON.)*

Prize Stallion, Lancaster, 1875.

Owned by J. J. Parker, *West Chester, Pa.*

Photo. from Life by Hovey, Phil^a.

CAN THE COLOR OF FRUITS AND FLOWERS BE CONTROLLED AT PLEASURE?

By Doctor J. R. Hayes, *Harrisburg, Pennsylvania.*

Fruits, in the act of maturing and at maturity, possess characteristic colors—occasionally modified, however, by certain causes, that make variations in color—even among the same varities grown on separate plants.

The fact that these variations do exist, argues the operation of causes that produce variability independent, in a measure, of the normal causes that make the characteristic and distinct color in fruit. If these variations in nature are produced by local causes, it is not possible for us to control the color at pleasure; or intensify that which nature supplies? This question, if answered, affirmatively, would pre-suppose a knowledge of how colors are produced in nature as we find them—a knowledge not yet fully established, but there can be no question that we are marching rapidly upon the road to a correct apprehension of this one of nature's many mysteries.

With this knowledge in possession, together with the consequent appreciation of conditions that produce the variations, we ought to able to elaborate a system by which color, natural to fruit, may be intensified or more clearly defined, at will, and even to make inroads upon the stability of normal colors themselves. Whilst it may not be profitable for us to be able to change an apple that is normally of a golden hue to a red color, yet to be able to do so would give us the key to the whole subject, and make easy of accomplishment any desired adaptions of color as well as to take natural colors as our guide, and intensify them at conceived pleasure.

With these thoughts as a preamble to what we propose to sumbit in this essay, let us see how near to realization we can arrive at the matter in question. In doing this we need not enter into the exposition of the manner in which plants receive their food, nor the specific food adapted to each, except so far as may be necessary to the matter in hand, to prove the effect of certain elements in producing color in connection with their general office as plant food.

We know that the function of the leaves and other green parts of plants is to absorb carbonic acid, and with the aid of light and moisture to appropriate its carbon. These processes are continually in operation—first, to the growth of the leaf, then for the woody fiber, and lastly, for the production of matter similar in composition, such as gum, sugar, starch, and acids. The leaves and other organs of assimilation receive more nourishment than is necessary for their own support, and when the woody fiber has progressed to a certain extent, blossom and fruit appear. The functions of the leaves of most plants cease upon the ripening of the fruit, because the products of their action are no longer needed. The leaves then begin to yield to the chemical influence of the oxygen of the air, undergo a change in their color and fall off from the plant.

"It is a very general error to suppose that organic substances have the power of undergoing change spontaneously without the aid of an external cause. When they are not in a state of change, it is necessary, before they can assume that state, that the existing equilibrium of their elements should be disturbed, and the most common cause of this disturbance is undoubtedly the atmosphere which surrounds all bodies. The juices of the fruit or other part of a plant which very readily undergo decomposition retain their properties unchanged as long as they are protected from the immediate contact with the air, that is, as long as the cells or organs in which they are contained resist the influence of the air. It is not until the juices have been exposed to the air, and have absorbed a certain quantity of oxygen, that the substance dissolved in them begin to be decomposed." (Liebig Ag. Chem., p. 101.)

Now fruits must exhibit different conditions as relates to the chemical nature of their juices at the various stages of growth, up to perfect maturity. When matured, or in the process of maturing, the supply of soluble food is kept up, but when no longer needed for the development of the fruit itself, what becomes of the supply? Again: during growth, and even during the maturing stage, the juices of the fruit, although in direct contact with the atmosphere, resist decomposition, because protected by the cells in which they are contained, and the pressure exerted in the constant renewal of elements, or, in other words, the process of growth, the pressure of the sap, and the rapid assimilation of the fruit food into fruit cells, leave no time for the destructive agency of the oxygen of the air. Now, after a fruit is matured and taken from the parent stem, in proportion as its cell formation is incapable of resisting the destructive agency of the atmosphere, it sooner or later goes into the stages of fermentation and putrefactive decay. As the fruit ripens, or is in the process of ripening even on the parent stock, and when it no longer requires the amount of food to sustain growth and development as in its earlier stages, and when it is in the condition, partly, at least, of inability to resist the destructive agency of the oxygen of the air, by reason of the absence of many of the active forces—may not the fruit be in that incipient condition of decay—even while ripening on the tree, and clinging yet to its stem that Baron Liebig has described as "eremacauses," or slow combustion? How, otherwise, can we account for the chemical transformations that now take place at this stage to "mellow" the fruit for use, and give to it its normal ripe color? Let us see how far reason will establish our premises and the bearing upon the question we have under discussion. "Eremacauses, differs from fermentation and putrefaction, inasmuch as it cannot take place without the access of air, the oxygen of which is absorbed by the decaying bodies. Hence it is a process of slow combustion, differing from ordinary decay." (Liebig Ag. Chem. p. 90.)'

We have seen that the function of the leaf ceases as the fruit ripens—yields to the chemical influence of the oxygen of the air—changes color, and falls off. No one will deny that the leaves after they have fallen from the tree, even when buried and away from the direct decomposing influence of the air, will take on themselves the processes of fermentation and putrefactive decay, and become *humus* in time. In what condition is it just before it has fallen from the tree, and when its functions have ceased, so as to be any longer incapable of resisting the destructive agency of the air, and when it has changed its color? It is evident that its condition in reference to the oxygen, must be one of "slow combustion," or the "eremacauses" of Liebig. Analagous to it, must be the condition of the fruit, also as it pursues its course from the commencement to full maturity.

"The contact of ammonia and alkalies, in general, may be mentioned amongst the chemical conditions which determine the commencement of eremacauses, for their presence causes many substances to absorb oxygen and to decay, in which neither oxygen nor alkalies alone produce that change."(Liebig Ag. Chem., p. 101.)

At this point of our argument, we can assume that the distinctive coloring matter of fruit is not formed during the process of growth; but comes in with the other chemical changes that take place when the ripening stage sets in, a condition which we will assume to be one of slow combustion or eremacauses. At this stage, the juices in the fruit partake largely of the products of ammonia and other alkalies, by decomposition, as the plant food, which, no longer needed to promote its growth, are in that exact condition to be acted upon by the solar light and the atmosphere, to produce ripeness and normal color; or, in other words, the process of ripening is one of slow combustion. At this stage, too, it is remarkable how little change in the transposition of chemical elements will affect color. "A very remarkable kind of eremacauses takes place in many vegetable substances, when they are exposed to the influence of air, water, and ammonia. They absorb oxygen very rapidly, and form splendid violet or red colored liquids, as in the case of orcin and erythrin. The conditions which determine the commencement of eremacauses are of various kinds. Many organic substances oxidise when simply moistened with water; others when subjected to the action of an alkali. Gallic acid, hematin, and many other compounds, may be dissolved in water, and yet remain unaltered; but if the smallest quantity of a free alkali is present, they acquire the property of attracting oxygen, and are converted into a brown substance." (Liebig Ag. Chem., p. 95.)

"When colorless orcin is exposed, together with ammonia, to the contact of oxygen gas, the beautiful *red* colored orcin is produced. Now, the only changes which take place here, are that the absorption of oxygen by the elements of orcin and ammonia, causes the formation of water; the oxygen absorbed merely uniting with the hydrogen to form it." (*Idem.* p. 99.)

The reader will observe, in this case, how simple a transposition of the elements produces a beautiful *red* color. Now ammonia exists in every part of plants, and in fruit in its unripe condition. In the process of ripening, the ammonia is decomposed, and, in connection with the water formed by the decomposition, together with the air, light, and the solar rays, the *coloring* matter is developed, and with it the peculiar acids which characterize the fruit,

"Ammonia, too, is capable of undergoing such a multitude of transformations, when in contact with other bodies, that, in this respect, it is not inferior to water. It possesses properties which we do not find in any other compound of nitrogen. When pure, it is extremely soluble in water. It forms soluble compounds with all the acids, and, when in contact with certain other substances, it completely resigns its character as an alkali, and is capable of assuming the most varied forms. It changes into splendid blue and red coloring matters, when in contact with the bitter constituent of the bark of the apple tree, with orcin, and with erythrin. All blue coloring matters which are reddened by acids, and all red coloring substances which are rendered blue by alkalies, contain nitrogen; but not in the form of a base." (Liebig Ag. Chem., pp. 30–31.)

In an interesting essay, on "The Color of Autumn Leaves," by Mr. H. C. Lewis, the term *chlorophyl* is applied to the coloring matter in leaves. When this coloring matter is subjected to the action of ether and muriatic acid, it separated into two substances, one yellow and the other blue, which, when shaken together, produced a leafgreen. It is well known that acid will turn vegetable blue into red. If, then, we suppose that the juice of leaves is kept in a neutral condition by vital force, or by alkaline matter brought up in the sap, and that, when the active circulation of the sap ceases, the oxygen of the air rendered it acid, the leaf juice would, of course, redden the blue substance of the chlorophyl. Frost is one of the influences which arrest the circulation of the sap, and, in the manner stated, causes a change in the color of the leaf. If the frost occurs early in the fall, when there is plenty of juice in the leaves, the red colors are brilliant; but if the leaves die slowly, the juices dry up, the skin hardens, and the brown color of decay predominates. If the autumnal red leaf is exposed to an alkali, the green color is restored. The waxy varnish in different leaves will vary the color. Yellow leaves result when the blue substance of the chlorophyl is, from some cause, entirely destroyed, leaving the yellow part only, as is supposed to occur in some maple, chestnut, and other leaves. Chlorophyl, under the spectroscope, shows two well defined dark bands, one in the blue and one in the red part of the spectrum.

Let us now return for a moment to the consideration of the condition of "eremacauses," as we have applied it to denote the stage of ripening and maturity in fruits, as indicated by the chemical changes then occurring. Eremacauses, or slow combustion, is a kind of decay, differing from the ordinary process of decay only as to the part the oxygen of the air plays in the transformations of the object. Liebig says, that in putrifaction, the conditions are evidently present, under which the affinity of carbon for oxygen comes into play, and that neither expansion, cohesion, nor the gaseous state opposes the disintegration of rottenness, whilst in eremacauses, all these forces resist this process of slow combustion, and make the destruction tardy. This would be the very condition wanted for the ripening stage of fruits. It would appear, therefore, that in *absolute decay*, the affinity of the oxygen of the air, for the carbon of the object, is complete; whereas, in the process of decay, called eremacauses, the affinity of the oxygen of the air, for the hydrogen of the object, is equally complete. In the one case, carbonic acid is formed, which is always the case in putrefactive disintegration; in the other, water only is formed, as a result of this peculiar kind of decay.

This much of chemical differences in the two processes of decay and eremacauses, are necessary to be comprehended, in order for us to establish this latter condition, as present when plants and fruits take upon themselves the process of maturing, and to explain the phenomena then prevailing to produce ripeness and color.

We have seen that the function of the green parts of plants are to absorb carbonic acid, and, with the aid of light and moisture, to appropriate its carbon. The oxygen is thus set free from the carbonic acid, and plants thus become the agent for the supply of this element. In other words, plants absorb and live on carbonic acid, and throw out oxygen. This function is precisely the reverse of respiration in animal life. But the decomposition of carbonic acid by plants is arrested at night in the absence of light. In the absence of light, plants will absorb oxygen just the same as though it were dead, and undergoing the process of absolute decay, of course to be arrested upon the re-appearance of light. If a plant, then, in its vigor, simply by absence of light, takes temporarily upon itself the functions of a dead one, what shall we call that condition occurring at the ripening of the fruit, when the products of assimilation are no longer needed, and when the green color, the normal color, showing the action of light, and other chemical elements, has passed away? The quantity of oxygen absorbed by a plant, can be estimated pretty nearly by the different periods which the green leaves of plants require to undergo alterations in color, by the influence of the atmosphere. Those which continue longest green, will abstract less oxygen from the air, in an equal space of time, than those the constituent parts of which suffer a more rapid change. When the green leaves of the poplar, the beach, the oak, or the holly are dried under an air-pump, with exclusion of light, then moistened with water, and placed under a glass globe filled with oxygen, they are found to absorb that gas in proportion as they change in color. Therefore, we may safely state, that when a plant is in a condition to absorb the oxygen of the air, it is in the same position as though it possessed animal life. Respiration in animals must be regarded as a slow process of combustion, or eremacauses. Considered in a chemical point of view, it is actual decay in the midst of life. All physiologists agree to this fact, and "that while we daily live, we are daily dying, and that every meal we eat is a rescue from one death, and lays up for another; and that while we think a thought we die."

"And so from hour to hour we ripe and ripe,
And then from hour to hour we rot and rot,
And thereby hangs a tale."—*Shakespeare.*

Animal heat is a property possessed by all animals, whose existence depends upon the absorption of oxygen. This property extends to the seeds of plants, in the act of germination; to flower-buds, when developing, and to fruits, unquestionably, during their maturation.

The changes in color of forest leaves in autumn, from a normal green to all the colors so beautiful to the eye, can be accounted for in the same way—by their power of absorbing oxygen, which, uniting with the hydrogen in the juices, a slow combustion is set up, with the results as described. In the fall of the year, the leaf has ceased its growth, and has fulfilled all the functions required of it; and now is the time when it begins to absorb oxygen, and to ripen, as it were, before its absolute death. The appearance of frost only hastens the process, as it comes in the nature of a blight. How rapidly leaves change in color and fruit permaturely ripens, when a branch is rifted from the parent stem. All growth ceases; and the elements, no longer influenced by cell growth, natural supply, and vital action, soon become a prey to the decomposing action of the atmosphere, and the leaf and fruit, although abortions, assume the conditions of ripeness and color natural to maturity.

As a proof that the ammonia and other alkalies have been decomposed, and that the acids peculiar to the leaf have been formed through contact and union with the oxygen of the atmosphere, an office which we have shown ammonia particularly assumes to perform, the colored leaf is found to be in an acid condition, and, upon the application of an alkaline reagent, the normal green color is restored.

Now, it is clearly evident that the elements furnishing food to the plant for its growth and development, among which food ammonia plays a conspicuous part in common with other alkalies, undergo a series of transformations when the period of maturity sets in, in order to develop the characteristics of the fruit in form, taste, and color, with all other characteristics due to maturity.

In order that ammonia may be rendered capable of assuming this series of transformations at the proper time, the plant and fruit must be in a condition, as to vital action, to absorb or receive the oxygen of the atmosphere, in order that the acids and other vital properties of the fruit, among which is the color natural to it, may be formed therefrom. Now as we have shown that as soon as the oxygen of the air begins to be absorbed by a plant, the process of slow decay, or eremacauses sets in; and, therefore, the period is determined for the ammonia to assume another series of transformations. Without this condition of slow decay, produced by the absorption of oxygen, it is impossible to conceive how fruit, at its maturity stage of development, can assume the characteristics now incident to it. We know that all resinous plants, the prolific source of substances, chemically termed hydro-carbons, do not require oxygen from the air at any stage of development, and hence their leaves retain their green color much longer than other plants. Inasmuch, as plant, leaf, and fruit cannot attain perfect maturity without the food peculiar to each, so the distinguishing marks of color incident to the fruit cannot be produced unless the conditions are present at the proper time.

Irregular supply of the proper element would necessarily produce *variations* in color, differing, more or less, with the standard, as the effect of full vital action. When roots cannot find their appropriate food they will take up with another, and this will account for variations in color, if ammonia is wanting, and if, as we claim, ammonia is the source of color. According to M. Morat, the distinguished French chemist and author, the coloring matter of flowers consists first, of *cyanine* or a blue pigment; second, a pink or rose colored matter; third, two yellow colored matters. A slight preponderance of acid in the plant juices will turn the blue cyanine to a red—excess of alkali will turn blue cyanine to green, while oxygen will restore the color. All these colors in plants are extremely sensitive. *No element, except ammonia, is capable of assuming such transformations—alternating from its character as an alkali to the most opposite and varied forms, and it must be ammonia that is the source color in plants and fruits.*

Writers have ascribed this function to charcoal, but they have inadvertently given it the credit that belongs only to ammonia. Charcoal was simply the vehicle by which ammonia was conserved and kept, as in a store-house, for the wants of the plant as it needed it from time to time.

W. B. Simmons in a communication to the *Journal of the Farm*, writes as follows: "Charcoal, in a powdered state, in addition to being a most admirable deodorizer and disinfectant is said to possess the remarkable property of *changing* the *color* of *flowers*, experiments with it in England for this purpose having been attended with remarkable success. The following abstract of a report of these experiments may not prove uninteresting to some of the readers of your journal, and, possibly, induce them to test their correctness. The experimenter procured a rose bush full of promising buds, the flowers of which were of a *faded hue*. He covered the earth in the pot about one inch thick with powdered charcoal, and some days aftere found the blooms of a *fine lively rose color*. He next tried the powdered charcoal on petunias, and found that both the white and violet colored flowers were equally sensitive to its action. It always gave great vigor to the red or violet color of the flowers, and the white petunias became veined or red with violet tints; the violets became covered with irregular spots of a blueish or almost black tint. Many persons who admire them, thought they were choice new varieties from the seed."

Porous substances, like charcoal, possesses the power of condensing ammonia, and hence it is the *means* only of promoting the vigorous growth of plants. Besides, its absorbent power is greater than almost any other substance. In itself, charcoal can possess no fertilizing influence unless it is converted into humus.

We have thus seen that the ripening process is one of slow combustion or eremacausis; that, when in this condition, the absorption of oxygen by a plant or fruit is complete, and that this condition again is favorable to the wonderful transformations ammonia assumes in producing colors. The production of color by ammonia in connection with the general food of the plant—the one being the complement of the other—leads to the conclusion that color can, in a measure, at least be produced at will. Surely, if a plant is augmented in vigor and production by the use of certain means to that end, the production of color by the proper use of amonia, *the source of all colors*, is equally within our power. In addition to the nitrogen in the air that nature supplies always for the purpose, it may avail us to supplement nature with nitrogenous matter as a fertilizer to command the position at will.

FARMING IMPLEMENTS AND THEIR MOST ECONOMICAL USE ON THE FARM.

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To give a full and free description of all the implements and machinery that could be used successfully on a large farm, and to explain their advantages over human muscle, would fill a volume of no inconsiderable size, and as on the product of the farm, *all* are dependent, to a great extent, for *food*, without which, of course, life would be short, the object of the farmer is, or should be, not only to produce the greatest amount of life sustaining elements from a given amount of land, but to produce it at the least possible expenditure of either money or muscle, and to accomplish this, we come at once to our subject, farming implements and their most economical uses.

It is certainly not necessary, at this time, in the history of agriculture, to offer any argument to prove the necessity of using implements and machinery on the farm, nor is it necessary to go into a very elaborate description of many implements, good in their time, but long since passed out of use. Our object in the following pages, will be, as far as possible, to describe briefly, some of the most important operations to be performed on a farm, the best method of performing them, and the implements and machinery WE would use *in* performing them.

The farmer's year may very appropriately be divided into two seasons—seed time and harvest. The balance of his time, excepting what he needs for recreation, may, and should be devoted to preparing for these two seasons, and of the two, seed time claims his first attention.

We take for granted, that our farmers have their land cleared of timber, stumps, and stone, and surrounded with a substantial fence. The first, and most important thing then to be accomplished, is the thorough preparation of a seed-bed in which to plant his crops. The implements devised for this purpose are almost innumerable. The object to be accomplished, is a thorough breaking up of and pulverizing the soil.

Notwithstanding the many implements invented with the design of taking its place, the *plow* still holds its place at the head of the list of agriricultural implements, and to its use have we been chiefly indebted for our success as a grain growing people.

The simplest form of plow of which we have any knowledge, and which may yet be found in use in some places among some of our most degraded nations, is the crooked limb of a tree, with a projecting point for scratching or tearing the surface of the ground. This, of course, performed very imperfect work, yet it remained in use, with but little improvement, for centuries, and it is only within the past fifty years, that the plow has been brought to anything like its present degree of perfection.

To Jethro Wood, are we indebted for the first grand improvement, the introduction of the cast-iron plow into general and successful use, cheapening its construction, and perfecting its form. And others, since his day, have added many important improvements.

The use of steel, as a mould board, has greatly improved our plows for use in our western loams; but in the gravelly soil of the middle and eastern States, cast-iron plows are still in general use. But as it is the use, not the history of the plow, that we propose to discuss, we will at once to our task. There are two very important qualities belonging to every good plow: first, it should be of easy draft, and run with uniform depth and steadiness; second, the inversion and pulverzing of the soil, which should be as near perfection in both respects, as possible. This is of the greatest importance, as the harrow can only be depended upon to pulverize the mere surface. And any loosening that can be accomplished in plowing, is a gain of vital importance.

As to draft, the force required in separating the furrow-slice from the land, is much greater than many suppose, and we may safely infer that a large part of the power of the team is required in this separation, (and this has been abundantly proven by the use of the dynamometer) hence, the necessity of paying particular attention to the point and cutting edges of a plow. The point or share should form as accute an angle as possible, and all of its edges be kept sharp. When we consider not only the dividing of the earth itself, but the innumerable number of roots growing in a good heavy soil, we can easily imagine the decrease in the draft of a plow, made by keeping its cutting edges sharp. The form of the mould board, also materially affects not only the draft of a plow, but the quality of its work. The furrow-slice is first cut by the forward edge of a plow, then the inner edge gradually raised, until it is turned nearly or quite bottom side up, hence, the mould board must contain the properties of both the wedge and screw. If the object was merely to invert the sod, the mould board might be made to fit the shape of the furrow, as it is being turned over; but this would leave the furrow in clayey ground almost as compact as before it was inverted, and besides this, it would elevate the furrow as suddenly at the first when its weight is the greatest, as it would just before falling over, when its weight is but little.

To obviate this, and produce the best results in pulverizing, the point should be long, acute, and should be kept sharp. The mould board, instead of the regular curve of screw, should have more of the form of the wedge where it joins the share, and terminate with an *increased* curve. This shape would begin to raise the inside of the furrow the moment it is cut, and before the outside is reached by the cutting edge. The turning motion being continued, the furrow is gradually lifted to a perpendicular, when, coming in contact with the increased curve of the rear end of the mould board, it is not only turned completely over, but materially broken up; the force necessary to produce the breaking, or crumbling, of the furrow, being applied from the upper side of the plow, does not add to the draft; but rather would seem to relieve a part of the pressure of the sole of the plow. The pressure of the mould board being opposite to that of the land side, the plow naturally maintains an upright position. The share should be placed level, so as to cut a furrow of equal thickness on both sides. In sod plowing, a steel cutter may be used to advantage; but we have always been better satisfied with the working of our plow, when using a point or share with cutter attached. With a plow containing the principals we have endeavoured to describe, with the team properly attached, we are prepared to begin our first operation in preparing a seed bed. To secure a light draft, the team should be hitched as close as possible to the plow, and not have the whiffle-trees hit their heels in turning at the corners. A very little practice, with clevis and dial plate at end of beam, will enable us to adjust a well-proportioned plow to cut such a furrow slice as we may desire, and when a good plow is properly adjusted, it requires but little labor to keep it in place.

Of our next implements, the harrow, there are almost as many forms as there are of the plow.

From the original brush harrow, costing nothing but the cutting down of a small tree, up to the Garret horse hoe, costing the price of a team, we certainly have a sufficient assortment to suit the most fastidious; but as the only object accomplished by any and all of them is simply pulverizing the ground, we shall confine ourselves to but two forms out of the lot, as we have found these two to be amply sufficient to accomplish our object.

For sward land, the most perfect implement we have ever found is the Shares harrow, which will pulverize freshly inverted ground two or three times as deep as the common harrow. The teeth being sharp flat blades, cut with ease and sloping like a sled runner, they not only pass over any obstruction easily, but over and through the sod, causing the ground over which they pass to move side ways, instead of tearing it up and leaving the ground sliced and torn into a mellow soil. To complete the process we want any ordinary harrow, such as the "Geddes" or scotch harrow, with thirty or forty small teeth set sloping backward enough to clear themselves of any weeds that may not have been covered in plowing. This sloping of the teeth of the harrow not only very materially, lessens the draft, but prevents catching upon stones or roots, and we have always thought was much more effective in breaking clods.

We now have wherewith to prepare our seed bed. Our next operation is planting. Broadcast sowing is, by many farmers, still in use, but the great advantage of drilling over hand sowing has become so apperent that hand sowing is fast becoming one of the "lost arts."

By the use of the drill, all seeds are deposited at a uniform depth, and perfectly covered with earth. It vegetates and grows evenly, and the plants are strong and healthy, hence the crop is heavier. In the planting of corn, one man and team will do the work, and do it better, than eight or ten men without the drill.

The elements of a perfect grain drill are, ability to sow all varieties of grain, as also corn, peas, &c., without breakage, and with a continuous unbroken stream from each distributor, with ample power to control the amount discharged, under all circumstances, and to change quantity when desired.

We have several excellent grain drills now manufactured and sold in this country. With the drills we complete our planting, next comes the harvester.

Here again we see the superiority of steel, iron, and wood over muscle. To Henry Ogle, of Alnwick, England, are we indebted for the finger-bar, the most important part now in use in all mowing machines. This was in 1822, since then, our own inventors have brought the mower and reaper to their present high degree of perfection.

Good work is done by nearly all mowers now in market, hence we need only consider a very few points in them. Safety in operating and ease of draft are, perhaps, the most important. The placing of the cutter bar in the rear of the driving wheels, we think not only lessens the chances of accidents to the driver, by placing him in a better position for all purposes; but materially lessens the draft, by carrying the cutter bar hung from the driving wheels, instead of dragging it on the ground, or compelling the team to carry it, as it is usually attached to the pole. Inclosed gearing, such as we now find in the Hubbard and some other mowers, adds to the life of the machine, by preventing dust from gathering on the cogs and hastening their wearing out.

With our hay cut, we are ready for the horse rake, another great improvement over hand labor. Our most popular horse hay rakes, are those carried on two wheels, with independent acting curved steel teeth, so arranged, that by a slight touch of the foot, the rake discharges its load, and the teeth resume their place, ready to gather another load. By the additional use of the horse hay fork, of which we have many in market, we finish our haying, and next comes our grain.

To almost all of our mowing machines reaping attachments are now attached, which not only cut our grain, but deliver it in bundles ready for binding, and some of them add a binding attachment, thereby finishing the sheaf ready for shocking or stacking. Perhaps the most important difference in our reapers is in their rake doing its work fully as well as it could be done by hand, and delivering its grain in rear of machine out of the road in making another round. This should be simple in construction, and not likely to get out of order. Believing that oats, at least, should be thoroughly dried before being bound, we prefer, as a binder, a separate and perfect machine, such as is now built in our own State (Pennsylvania.) This machine has much the appearance of a horse hay-rake, is mounted on two wheels, is readily drawn by one horse, and easily operated by a half-grown boy. By its use you can bind your grain whenever it is fit, no matter when it was cut.

In writing of haying, we have omitted the Tedder and Hay-sweep, both good in their places, but can be got along without. Also in plowing, we omitted the weed-hook wheel, &c., for the same reason. We may, in a future article, confine ourself more particularly to these attachments.

As we now have our hay made and grain harvested, about all that remains to do is to thresh our grain. Beating out grain with a flail is now a thing of the past, and threshing machines have come into general use, and their name is legion, but we will consider only the larger and better class of this kind of machinery.

Two men, working with flails and fanning mill, would be likely to thresh and clean, in a day, say fifteen bushels of wheat, thirty-five bushels of oats, thirty bushels of barley, or sixteen bushels of rye. With a good threshing machine, such as are exhibited at our fairs, driven by eight horses, and attended by an equal number of men, *three hundred* bushels of oats, or one hundred bushels of wheat, can be threshed and cleaned in *an hour.* This class of threshing machines not only thresh, clean, and sack the grain, but elevate the straw to the top of the highest stacks.

As my article is already much longer than I anticipated, I will omit many small but very useful machines, such as dog-powers, corn-shellers, feed-mills, &c., and conclude my present article by calling the attention of our farmers to what I believe to be the "coming power" for the farm, viz: the steam engine.

The frequent use of a portable engine on our farm, for the past five or six years, has fully satisfied us of its merits as a farm power. Threshing our grain, grinding our feed, (oats and corn,) sawing our stove wood, cutting our straw, hay, and corn-fodder, sawing our shingles, pickets, and fence posts, making our cider, are only a few of the jobs done by the power of our engine. These jobs may all be done in stormy weather, such as a humane man would not like to work a horse in. This and much more can be done with a *stationary* engine; but when we come to consider a good *portable* engine, we hardly know where its work must cease. Such an engine, strong, heavy, and simple in construction, may be easily and safely managed by any one of ordinary judgment. Mounted on strong wheels, the power of the engine may be made to propel itself over ordinary roads, through plowed fields, or anywhere that an ordinary wagon can be hauled with horses. When fields are large we can find no better or cheaper power with which to plow, and in fact we can imagine no work which could be accomplished by the use of horses, that could not be better and cheaper done by the use of such an engine. Verily the world moves on the farm as elsewhere.

ON MOWERS AND REAPERS, AND ON CORN HARVESTERS.

By President ALFRED L. KENNEDY, M. D., *Polytechnic College, Philadelphia.*

Article 1 Classification of Mowers and Reapers.

The rapid multiplication of mowing and reaping machines, their various styles, and the number and complexity of their mechanical movements, annually increase the difficulty of justly comparing their respective merits. The difficulty is keenly felt by the inexperienced buyer, and it confounds the judges of rival claims at our agricultural fairs. It is intensified by the bold assertions and the voluminous "testimonials" of contending inventors and manufacturers, who holding patents for trifling modifications, laud them as of vital importance. Societies seldom include on their rolls of members a sufficient number of "experts" able to decide upon the merits of competing machines. Absurdly contradictory awards are made every year, rendering manufacturers indifferent about exhibiting, lessening the public estimate of the value of the prizes, and is encouraging unsuccessful competitors to urge the charge of favoritism.

Some kind of classification of these machines would seem to be absolutely necessary to assist purchasers and juries in making up their minds upon essential points of difference. To be of value, such clasification should not be based upon minor characteristics, but rather upon those which distinguish the machine as a whole. Not, for example, on the width of cut, or the position of the cutting bar in the front or rear of the right drive wheel of the machine, but upon *the systems by which the slow rotary motion of the wheels is converted into the rapid reciprocating motion of the connecting rod.*

Such a system is technically termed "driving gear." By a careful examination of the principal machines in the market, the farmer perceives that they arrange themselves under a number of systems or types, differing from each other in the devices used to transmit power and change its direction. First, there are machines in which the reciprocating or to and fro motion of the connecting rod or pitman is produced by a crank pin, and second, there are others in which such motion is produced by a cam. The former division comprising, as it does, nearly all the machines in use in this country, may be sub-divided into two very unequal groups, according to the means used to convert the rotary motion parallel with that of the drive wheel, into a rotary motion which is at right angles with the former and crosswise of the machine. There are three well marked classes of machines in which this change of direction of the motion is affected by bevel gearing.

CLASS I. The first of these classes may, with great propriety, be constituted of all those machines which have a bevel wheel on the axis of a spur pinion of the driving gear.

Sub-Class *a*. A familiar make of this class has the spur wheels attached to and made part of the drive wheels. So common is this form, that it deserves to be erected into a sub-class. Each spur wheel, which is cast on what is to be the inside of the spokes of the drive wheel, operates a pinion, the axle of which usually extends across the machine to a corresponding pinion on the opposite side, operated in like manner. This axle, then the common axle of two pinions, carries a bevel wheel, the pinion of which operates a longitudinal crank shaft, the forward end of this carrying the crank pin, which drives the pitman. The enumeration in order of the members which compose the driving gear will render the peculiar feature of this sub-class quite apparent. The members are 1, spur-wheel; 2, pinion; 3, bevel-wheel; 4, bevel-pinion; 5, crank-pin; 6, pitman.

Sub-Class *a*.—Has several varieties, some having the spur-pinion in front of the axle of the drive-wheels, of which the Kirby is a good example. (See Fig. 1.) Others having the spur-pinion behind said axle.

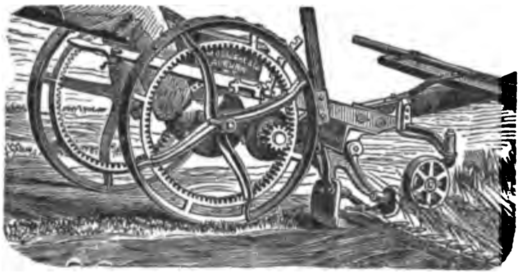


Fig. 1. Driving Gear of "Kirby" Mower, Illustrating Class I, Sub-Class *a*.

Sub-Class *b*.—Another sub-division of Class I is composed of machines having the spur-wheel on the axle of the drive-wheels instead of on the wheels themselves, the whole gearing being central. The spur-wheel engages a pinion on the axis of which is a second spur-wheel. This drives a pinion carrying on its axle a bevel-wheel. The axle of the pinion of this wheel, running, of course, lengthwise of the machine, at the front carries the crank-pin, with pitman attached.

The driving-gear has more members than that of the preceding sub-class. They are 1, spur-wheel; 2, pinion; 3, spur-wheel; 4, pinion; 5, bevel-wheel; 6, bevel-pinion; 7, crank-pin; 8, pitman.

The Walter A. Wood new mower (see Fig. 2) is a good example of this sub-class.

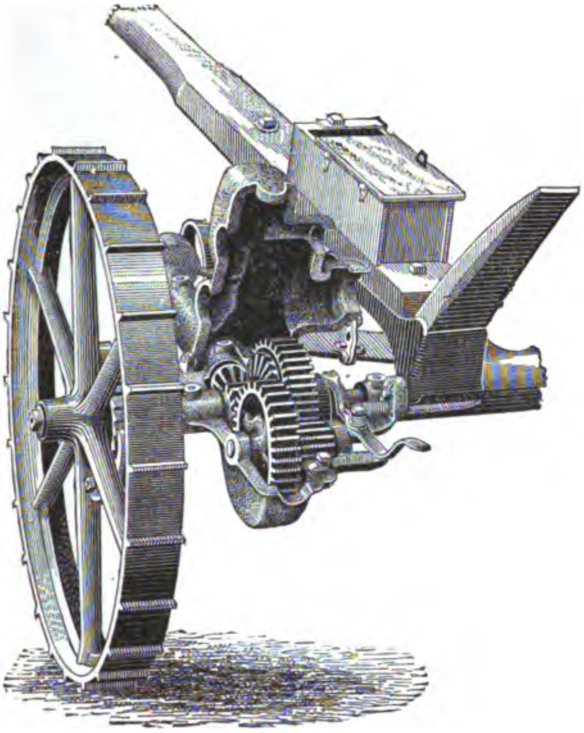


FIG. 2. DRIVING GEAR OF THE NEW "WOOD" MOWER, ILLUSTRATING CLASS I, SUB-CLASS *b*.

CLASS II.—Machines belonging to this class have neither cog-wheels on the drive-wheels nor spur-wheel on the main axle, but this axle carries a bevel-wheel, the pinion, of which operates a longitudinal shaft, carrying at the rear of the machine a spur-wheel. This gives motion to a pinion, the shaft of which runs forward to the front of the body of the machine and carries the crank-pin. The power is, therefore, transmitted by a series of six elements, viz: 1, bevel-wheel; 2, bevel-pinion; 3, spur-wheel; 4, pinion; 5, crank-pin; 6, pitman. The bevel-wheel on the main axle is the distinguishing feature of this class.

Class II is represented by the "Buckeye" machine in its many varieties.

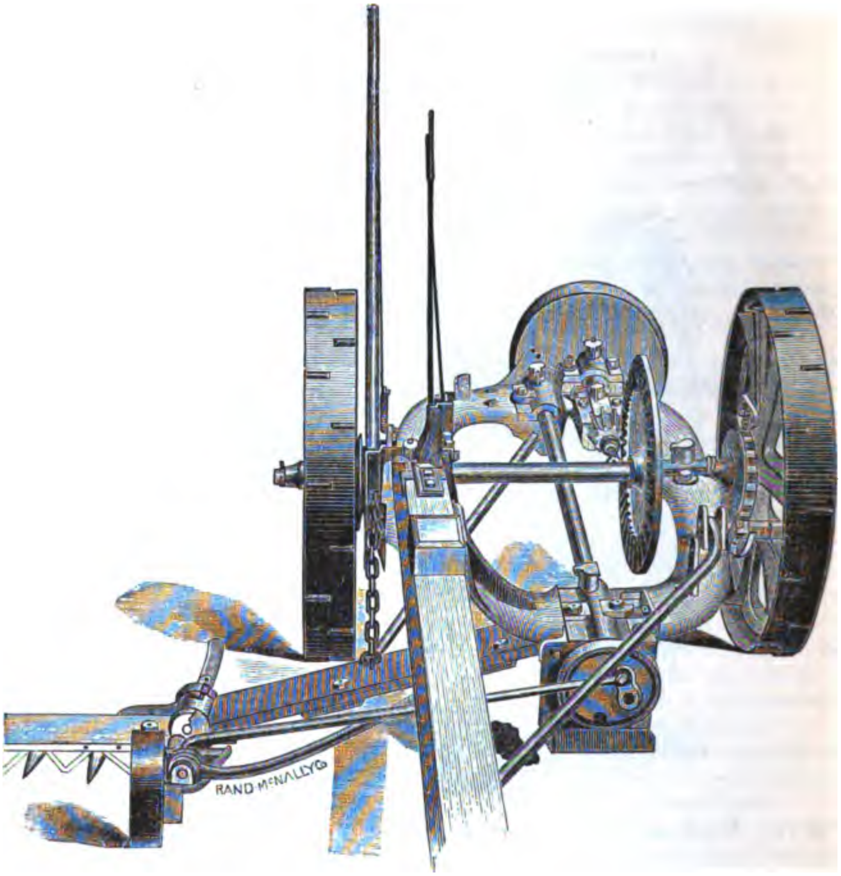


FIG. 3. DRIVING GEAR OF "BUCKEYE" MOWER, ILLUSTRATING CLASS II.

CLASS III.—Machines of this class have but a single drive wheel. Just within the rim of this wheel is a bevel-wheel, the axle of the pinion of which runs backward and operates a spur-wheel. This gives motion to a pinion, the axle of which carries the crank-pin. The driving gear, therefore, consists of six members, viz: 1, bevel-wheel; 2, bevel-pinion; 3, spur-wheel; 4, spur-pinion; 5, crank-pin; 6, pitman. The "Little Giant" mower, Fig. 4, specially represents Class III.

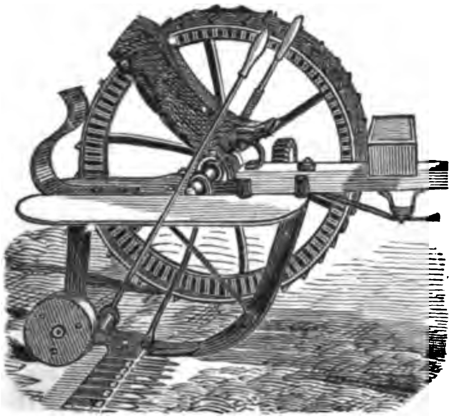


FIG. 4. DRIVING GEAR OF "LITTLE GIANT" MOWER, ILLUSTRATING CLASS III.

CLASS IV.—The attention of the farmer is so frequently called to machines in which bevel gearing is dispensed with and the bent lever substituted as a means of changing the direction of motion from longitudinal to transverse, that the expediency of forming a class of these machines will scarcely be questioned. They are fortunately so distinct from those above described that little difficulty will be found in assigning them a separate place on a slight examination. Their distinction among themselves is also strongly marked, and may be made the foundation for two sub-classes. In machines belonging to the first of these, the bent lever is on the shoe; in those of the second, it is attached to the frame.

SUB-CLASS *a*.—Both drive wheels are cast with internal or concave spur-wheels, operating two pinions on one shaft in rear of the main axle. The shaft carries a spur-wheel which in turn drives a pinion, the axle of which carries the crank pin. This, the pitman, extending forward, connects with a bent lever or bell crank on the shoe, the other end of this lever being attached to a pin on the head of the cutter-bar. The motion of the knives in cutting, therefore, is at right angles with that of the pitman. Formerly, side cutting machines were made on this system, but the manufacture is now believed to be confined to those with direct draft, the cutter-bar being in front of the driver, one of whose horses walks in the standing grass. Seven members transmit the power in these machines, viz: 1, spur-wheel; 2, spur-pinion; 3, spur-wheel; 4, spur-pinion; 5, crank-pin; 6, pitman; 7, bent-lever. Sub-class *a* is represented by the "Eureka" mower, Fig. 5.

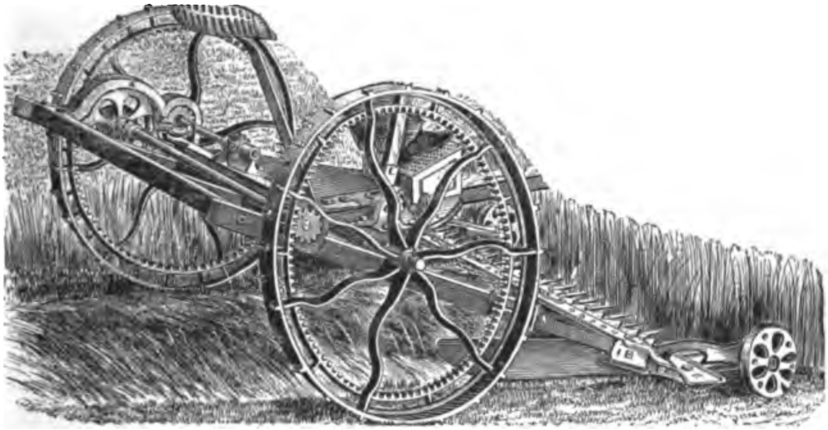
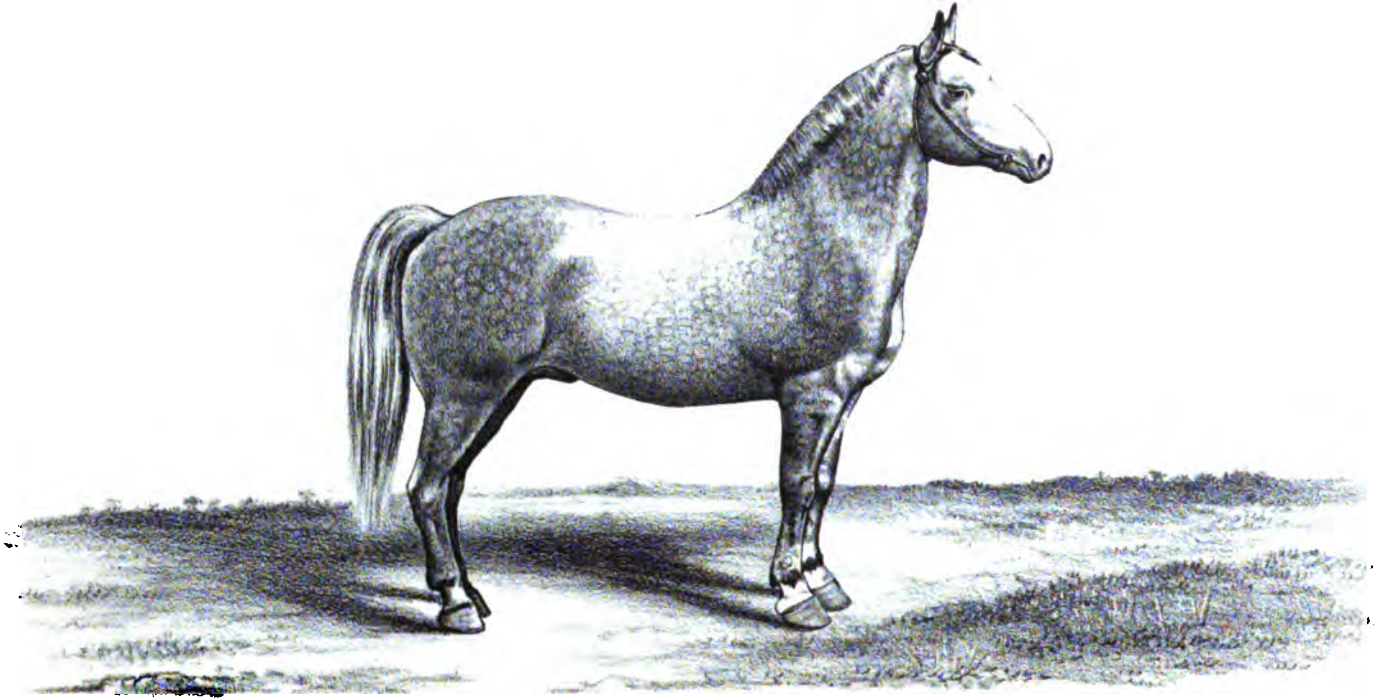


FIG. 5. DRIVING GEAR OF "EUREKA" MOWER, ILLUSTRATING SUB-CLASS *a* OF CLASS IV.

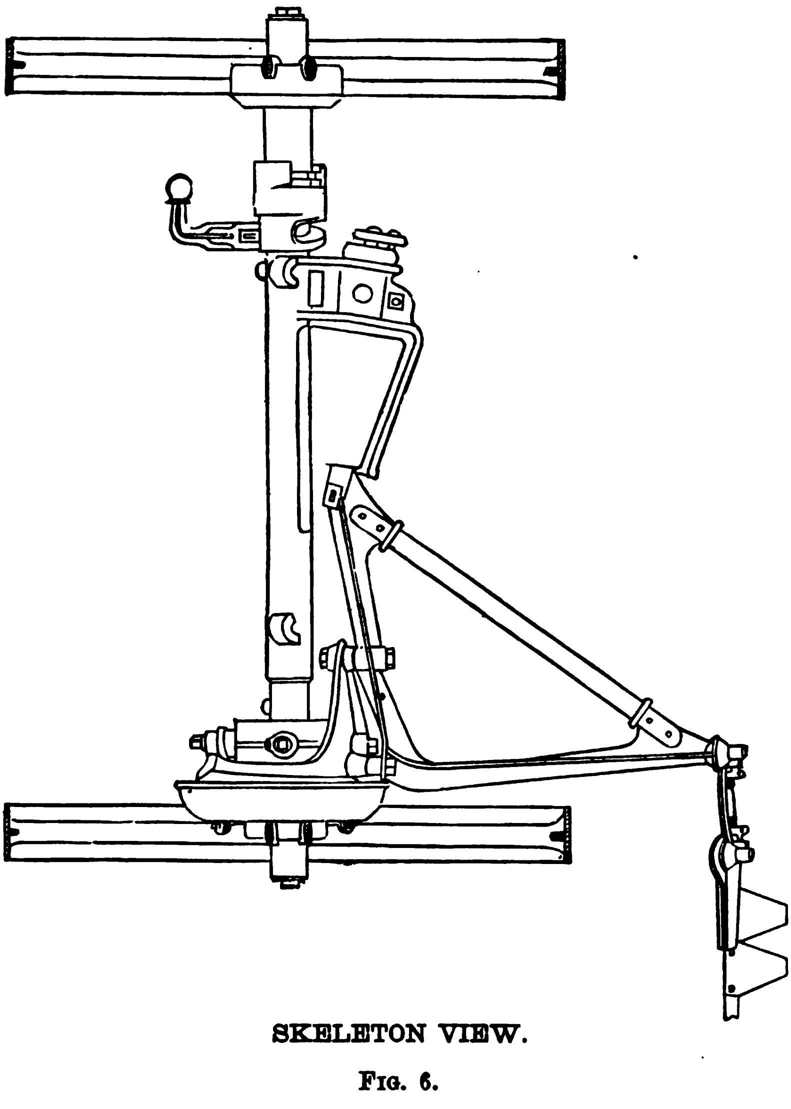
SUB-CLASS *b* OF CLASS IV.—There is but one machine in the market which has the bent lever that operates the pitman, attached to the frame; but it differs so widely from all others, as to be worthy of the distinction of filling a sub-class. Nor will it be easy for the reader, even with the aid of the well-executed cuts presented below, to get a clear conception of the construction, and especially of the mode of action of the parts. These consist of a small, convex, toothed wheel, closely resembling a bevel wheel, fitted on to the main axle, against the inside of the hub of the right wheel; a concave toothed wheel, of slightly larger diameter, its teeth of a size to fit into the spaces between those of the other, is attached by radial screws, passing through its prolonged hollow axle, to a collar, which, in like manner, is attached to a cylindrical portion of the iron frame of the machine, which encircles, like a sleeve, the main axle. The concave wheel is, therefore, held only by a "universal joint," and its proximity to the face of the convex wheel is such, that when the teeth on one of its edges are engaged, those on the opposite edge are freed. A rocking, as well as a rolling motion is given to it by the revolution of the convex toothed wheel, fixed on the main axle. The rocking, rolling, motion of the concave wheel is controlled by the movement of an arm of the bent lever, which is firmly attached to it. This arm extends crosswise, nearly parallel with the main axle, until it reaches a crank-pin on the end of a small, heavy, conical wheel, revolving on a mandril projecting from the frame. The motion which the concave wheel imparts to this arm, causes the crank-pin wheel to revolve. These revolutions being maintained, give regularity to the swing of this arm of the bent lever, and, of course, to the other arm, which extends forward at right angles with it. The transverse swing of the latter imparts, by a short pitman and a ball and socket joint, a reciprocating motion to the cutter bar.

The bent lever forms, in fact, part of the concave toothed wheel, and rocks with that wheel on the "universal joint," and the driving gear consist of: 1, convex toothed wheel; 2, concave toothed wheel and bent lever; 3, crank-pin; 4, pitman. Class V, sub-class *b*, is represented by the new "Champion" mower. Figs. 6 and 7.



PRIZE PERCHERON

Photo. from Life by Hovey, Phil^{a}.



SKELETON VIEW.

FIG. 6.

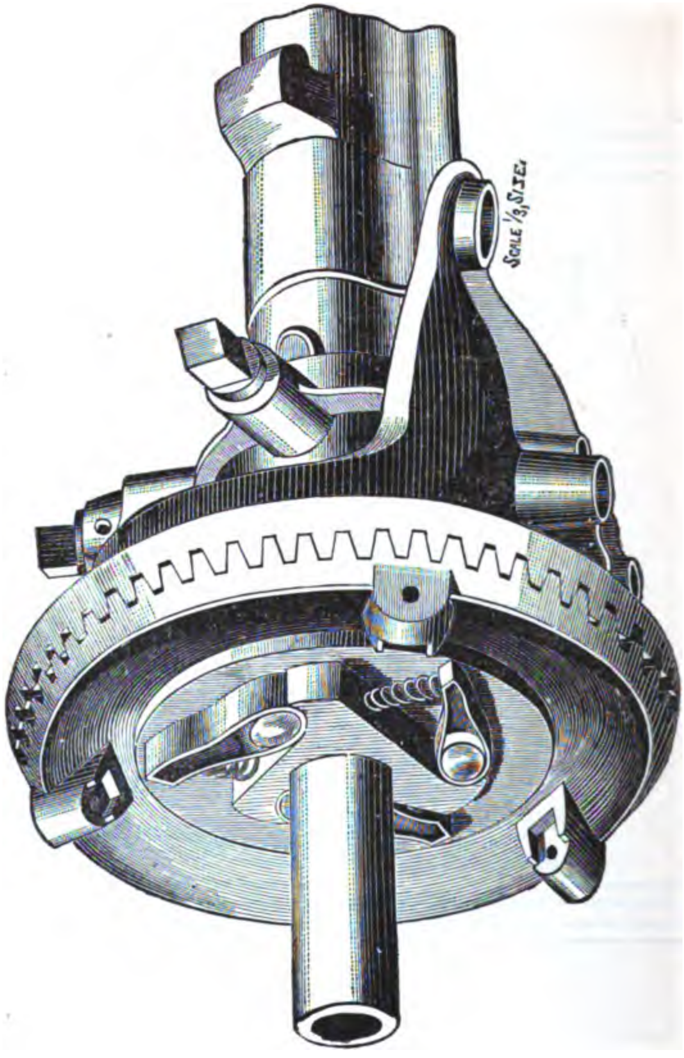


FIG. 7.

FIGS. 6 AND 7. DRIVING GEAR OF NEW "CHAMPION" MOWER, ILLUSTRATING CLASS V, SUB-CLASS *b*.

Fig. 6, showing bent lever, crank-pin wheel, and short pitman; the toothed wheels being boxed. Fig. 7, showing toothed wheels, and "universal joint."

CLASS V.—The system of transmitting power directly from the drive wheels or their axle to the crank pin by the interposition of an endless or tangent screw differs entirely from all others, and may well be made the basis of a separate class. The tangent screw is operated directly by a worm wheel attached to the main axle. Both wheel and screw are cast of red metal, the latter is made two-threaded, is fitted to the frame of the machine, and is actuated by the lower margin of the rotating worm wheel. The axle of the tangent screw extends forward, and carries the crank pin, which drives the pitman. The driving gear consists of: 1, worm wheel; 2, tangent screw; 3, crank pin; 4, pitman; hence machines of this class can be at once identified. The fifth or tangent screw class finds its sole representative in the "screw" machine. The extreme simplicity of the driving gear renders illustration unnecessary.

CLASS VI.—In the above classes are comprised the machines most frequently found in the American market, but in foreign markets, and, to some extent, in ours, methods of converting the rotary motion of the drive wheels and their axles into reciprocating motion by means of cams are occasionally seen. This reciprocating motion has been obtained by constructing the drive wheel with a rib, running round inside the rim, its scalloped edge projecting towards the hub, more or less slightly at regular intervals, so as to give it a sinuous outline. To a nearly horizontal sliding bar, a grooved roller is attached, its groove bearing against and partly embracing the sinuous projecting edge, the bar receiving therefrom a reciprocating motion as the machine is drawn forward. This construction finds no favor here, but a modification of it was to be seen in the Russian department of the Centennial Exhibition, having a spur wheel on the main axle. This operated a pinion, carrying on its axle a cam wheel, with the cams projecting from its convex surface. These gave reciprocating motion to a sliding bar, in a manner similar to that just described, and thence to the pitman.

CLASS VII.—An exceedingly ingenious application of the cam movement to mowers has been made in this country by casting the projections upon the face of a small wheel, in the form of radial ribs. Rapid motion is given to this ribbed wheel by putting it upon the axis of a pinion driven by a spur-wheel on the main axle. A similarly ribbed wheel, the ridges of which fit exactly into the furrows of its mate, is so fitted as, when in that position, not to rotate with it, but to slide to and from it at right angles, with the plane of rotation. Thus by the sliding of the ribs on the face of one wheel, up and down the sides of the ribs on the face of its opposing mate, reciprocating motion across the machine is obtained and imparted to the pitman.

Class VII is represented by Goodwin's machine.

To group the above classes under a few heads, to arrange them in the form of a schedule on a single sheet, is simply to imitate the convenient methods pursued in the study of natural history. The following schedule has been prepared with this view. Taking as its basis that movement common to mowers and reapers, whereby rotary motion is converted into reciprocating, it groups them under two divisions, and the divisions are characterized, one by the crank-pin, the other by the cam. Machines of the former division are further classified according to the means used to obtain transverse motion, whether by bevel gearing, bent lever, or tangent screw. Those of the latter division according to the position of the cams, whether on the edge of the cam-wheel or on its face.

Mowers and Reapers—Schedule of Classification.

Reciprocating motion produced by	Change of direction of motion produced by	Location of Bevel Gearing.	Number of class.	Location of Main Spur Wheel and of Bent Lever.	Sub-classes.	Driving Gear consists of	Example.
CRANK PIN,	BEVEL GEARING,	Bevel wheel on spur pinion axle,	I,	Main spur wheel on drive wheel,	a,	1. Spur wheel; 2, spur pinion; 3, bevel wheel; 4, bevel pinion; 5, crank pin; 6, pitman, . . .	"KIRBY."
				Main spur wheel on main axle, .	b,	1, spur wheel; 2, spur pinion; 3, spur wheel; 4, spur pinion; 5, bevel wheel; 6, bevel pinion; 7, crank iron; 8, pitman, . . .	NEW "WOOD."
		Bevel wheel on main axle, . . .	II,	. . . .	. .	1, bevel wheel; 2, bevel pinion, 3, spur wheel; 4, spur pinion; 5, crank pin, 6, pitman, . . .	"BUCKEYE."
		Bevel wheel on drive wheel, . .	III	. . . .	. .	1, bevel wheel; 2, bevel pinion; 3, spur wheel; 4, spur pinion; 5, crank pin; 6, pitman, . . .	"LITTLE GIANT."
	BENT LEVER, . .	. . . .	IV,	Bent lever on shoe	a,	1, spur wheel; 2, spur pinion; 3, spur wheel; 4, spur pinion; 5, crank pin; 6, pitman; 7, bent lever, ...	"EUREKA."
				Bent lever on frame, ...	b,	1, convex toothed wheel; 2, concave toothed wheel and bent lever; 3, crank pin; 4, pitman,	NEW "CHAMPION."
	TANGENT SCREW,	. . . .	V,	. . . .	. .	1, worm wheel; 2, tangent screw; 3, crank pin; 4, pitman, . . .	"SCREW."

Reciprocating motion produced by	Description.	No. of class.	Example.
CAM, ...	The cams on the internal or external edge of cam wheel operating a grooved roller, revolving in head of pitman, ...	VI.	"WARDROP."
	The cams on the face of cam wheel operating its mate, which is connected with pitman, . . .	VII.	"GOODWIN."

Article II.—The Points of Excellence of Mowers and Reapers.

To classify a mower or reaper and compare it with others of the same class, is the most direct way to determine its value for the purpose in hand. There are, however, many points of detail which too often escape attention altogether, or which, if considered, are not duly weighed. In order that these points be kept well in mind, and that each have its due importance, they must be tabulated and arranged for ready reference, and their values assigned them in figures on a scale of a hundred, or in order to avoid fractions, on a scale of a thousand. Although the fact may not be generally known, yet this work has already been done, and it remains as one of the good fruits of the Centennial Exhibition. A committee of the Centennial Bureau of Agriculture met a committee of the National Convention of Manufacturers of Mowers and Reapers, then in session in Philadelphia. The joint committee, after several meetings and long and earnest discussions, adopted a miligrade scale, or scale of one thousand parts, and agreed to recommend that qualities determinable by field trials, should have a value of 650, or nearly two thirds of the whole. These qualities were decided to be: Work, having a value of 250; Safety and Ease of Management, value, 175; and Draught value, 225.

Construction and Durability—Qualities determinable by examination of machines at rest, were each awarded a value of 175, distributed as follows: Construction—1. "General harmony of parts." A quality possessed only when all parts used to produce change of motion concur to that end without interference either with each other or with any other series of parts. To this was assigned a value of 35. 2. "Adaptation of parts." Their shapes and sizes being those best suited to their purposes 30. 3. "Mechanical construction of parts." Relating to the work of the machinist in fitting the fixed and movable joints, sliding and rolling connections, bolts, screws, pins, &c., 100. 4. "Simplicity of construction." A quality based upon the fewness of the parts and the absence of all complexity in them, 10.

Durability—1. "Materials and strength of parts." The materials whether wood, iron, steel, or brass, being well suited to their respective purposes, and of good quality, 80. 2. "Combination of parts." The combination being such as to prevent, as far as practicable, their becoming too tight or binding, or too loose by shrinking, shifting, or wearing, 45. 3. "Provision for compensating wear," *i. e.* by tightening nuts, introducing washers, and other means of taking up lost motion, 25. 4. "Facility with which parts broken may be re-placed," 25.

With this explanation of the points contained in the first two divisions of the table, it is now presented in full, almost as it was finally approved by the Bureau and the Convention.

The total number of points is twenty-nine. Total value of points, one thousand.

Scale of Points of Mowers and Reapers.

DIVISION A—CONSTRUCTION.

1. General harmony of parts,	35	
2. Adaptation of parts,	30	
3. Mechanical construction of parts,	100	
4. Simplicity of construction,	10	
		175

DIVISION B.—DURABILITY.

1. Material and strength of parts,	80	
2. Combination of parts,	45	
3. Provision for compensating wear,	25	
4. Facility with which parts broken may be re-placed,	25	
		175

DIVISION C.—WORK.

1. Quantity of work,	130	
2. Variety of work,	55	
3. Adaptation for work,	35	
4. Speed—fast or slow,	10	
5. Width of cut,	15	
6. Freedom from noise,	5	
		250

DIVISION D.—SAFETY AND EASE OF MANAGEMENT.

1. Safety to driver,	40	
2. Safety to horses,	15	
3. Position of driver's seat, foot-rest, and levers,	25	
4. Facilities for backing and for turning corners,	20	
5. Facilities for regulating height of cut,	35	
6. Ease of transfer,	10	
7. Accessibility to parts,	30	
		175

DIVISION E.—DRAUGHT.

1. Power required to draw machine out of gear,	5	
2. Power required to draw machine in gear,	5	
3. Actual power required while cutting,	120	
4. Proportion of weight made available to driving cutter-bar,	10	
5. Extreme vibration of dynamometer needle while cutting,	25	
6. Irregular draught,	30	
7. Side draught,	20	
8. Weight on horses neck while cutting,	10	
		225
		1000

To the machine which shows, by the self-recording dynamometer, the least "actual power required while cutting," the value 120 is given by the above scale; but, as the dynamometer indicates traction pounds, these, for all other machines at the trial, must, by a simple calculation, be converted into values of the scale. Thus: suppose that three machines of the same class are being tested, and their draughts in traction pounds to be 135, 157, and 178, respectively. The machine of the lightest draught standing 120 in the scale, then the standing of the second will be found, by inverse proportion, to be 103 in the scale, (157 : 135 :: 120 : 103.) By a similar calculation the standing of the third will be 91, (178 : 135 :: 120 : 91.) The numbers 120, 103, and 91 representing, on the scale of points, the traction pounds, 135, 157, and 178, recorded by the dynamometer.

Article III. Corn Harvesters.

Machines for cutting standing Indian corn do so, either by a blow with a knife, or by the action of revolving cutters. Both these varieties of machines are drawn by horses, and have platforms upon which the corn, as cut, falls. In both, the power is imparted by the driving wheels, upon which the machine rests. These are similar in appearance to the wheels of reaping machines, but are stronger, of larger diameter, and with a broader tread. In the single knife machine, the blow is forward and downward in front of the platform, which, supported as in the reaper, is on the right of the driver, who, in cutting hill corn, drives round the field. The motion is transmitted from the supporting or driving wheels, and imparted to the knife by a system of shafts and gearing somewhat like that which gives motion to the sweep, which throws off the *gavels* from the platform of reapers, the direction and suddenness of the blow of the knife being obtained by the form and position of the cam. The corn as it accumulates on the platform is removed by hand.

The corn harvester with circular cutters has them placed on the front of the machine, a little to the right of the middle of the transverse bar of the frame. One horse walks on either side of the row of corn which is being cut. The stalks, guided by standards rising from the frame, fall between them, and just behind the cutters on to the platform. This has an endless floor, by the motion of which they are carried to the rear and dropped.

The power is transmitted from the drive wheels by a spur wheels, the hub of which is a sleeve fitting on the axle. A sliding clutch on the same axle, by moving a lever at the left hand of the driver when in his seat, is made to interlock with the sleeve, and set the spur wheel in motion. This engages a pinion on the axis of which is fixed a second spur wheel, by which rapid motion is given to a pinion, the axle of which extends across the machine, and has a bevel wheel on either end. Each of these wheels actuates a longitudinal shaft, one of which is on the right, the other on the left of the endless floor of the platform. Both extend as far forward as the front bar of the frame of the machine, where by level gearing, they impart horizontal motion in opposite directions to the two revolving cutters. These cutters somewhat resemble circular saws, being formed of stout saw plate. They are placed equi-distant from the median line of the platform, but not in the same horizontal plane, being so set that one shall overlap the other by the length of its teeth, the opposing edges of which as they revolve, graze each other. The teeth are not detachable, but form part of the cutter plate itself.

The entire diameter of the cutters is about fifteen inches, and for safety in operating, the outer half of each is guarded by an iron semi-circular sheath, which also serves, as the machine advances, to guide the stalks until they are seized and cut by the teeth of the inward-revolving cutters. The driver's seat is on the left of the platform, and the pole, to which the near horse only is attached, is bolted to the frame, on the left of the cutters. The off horse is simply attached by traces. From the front extremity of the pole, a stout iron rod extends forward and downwards for the purpose of lifting stalks which have been blown over on that side. Those lying on the other side are lifted by a similar rod, extending from the corner of the frame.

The machine carries a husking attachment, which consists of a pair of corrugated iron or steel rollers, connected with the spurred gearing above described, and placed at the rear end of the endless floor of the platform.

By the movement of the floor, the stalks are fed between the rollers, which draw them through with sufficient power to force off the ears, while the husks remain attached. The ears, as they fall, are caught by an endless band, which delivers them into bags hung at the side, while any loose corn falls into a large box at the bottom. The stalks, as they leave the rollers, fall on to a frame, which, when they accummulate in sufficient quantity to form a shock, turns and drops them.

THE RELATION OF ALKALIES WITH THE NITROGEN OF THE ATMOSPHERE TO SOILS, AND THEIR EFFECT ON LIVING PLANTS.

By Dr. J. R. HAYES, *Harrisburg*, *Pennsylvania.*

Colonel A. K. McClure, of Philadelphia, in his agricultural address at the State fair held at Erie, in September, 1878, dilated to some extent upon the importance of the atmosphere as a natural fertilizer of the earth. Said he, "just as deep as you send your plow share, just so deep will the pure air of heaven permeate and enrich the the soil." This is true in the main, and is the basis of successful and practical farming. It is the nitrogen in the air which constitutes four fifths of its volume that makes the atmosphere a natural fertilizer. But other conditions precedent are necessary to render, at all times, the vitalizing energy of the nitrogen in the air effective. Whatever chemical elements we find in the ashes of plants are indispensable to their development, for if they are wanting in the soil itself, the plant cannot thrive. Potash, lime, phosphate of lime, and nitrogenized matter are the four cardinal elements of plant food, but these may all exist in the soil, and not in such a soluble condition as to render them effective in successful cultivation. Manures are said to be assimilable or available when the plants are able to absorb them, and plants only will absorb them when the substances are soluble. Again some plants will absorb nitrogen from the air, and others, such as wheat for example, must absorb it from the soil only. As the surrounding atmosphere of the earth is composed largely of nitrogen it will be thus seen where the beneficial results of air comes in, especially in cases where plants obtain this essential fertilizer from this source in nature. But wherever a soil is wanting in any *one* of these four essential principles, we shall, as a general rule, have poor crops in cereals.

For example some plants will flourish in the presence of lime, phosphate of lime, and potash, others again will show no vigor. Beans, peas, clover, sugar-cane, etc., will thrive well under the application of these three elemental fertilizing agents, because these plants will absorb from the air all the nitrogen they require, but wheat would not thrive under the application of the three without the addition of the fourth, because it has to absorb its nitrogen from the earth. To prove this we need only to take a portion of earth and calcine it in order to destroy all the nitrogenous elements that it contains; then if we apply to this calcined soil, lime, potash, and phosphate of lime, soluble enough for absorption, clover, beans, and peas will flourish luxuriantly, because we find in the ashes of these plants, as soon as we burn them, nitrogen, that must have been absorbed only from the air. Rotation of wheat and other cerals that take their nitrogen only from the earth, with other crops that take their nitrogen from the air, is thus reduced to a plain scientific truth. Again, too, the application of nitrogenous matters as fertilizers is both the scientific and practical plan for the successful cultivation of cereals for the same reasons.

In France and Germany certain well known and plain rules are in use, giving definite proportions of these four fertilizers, so that it is known how much and what to apply for wheat, beets, corn, hemp, potatoes, beans, peas, etc., so as to insure always a maximum crop under ordinary given conditions.

By careful experiment on a small scale, from year to year, our American farmers could readily and easily reduce what is now known as sure principles in agricultural chemistry to complete and perfect practice, and thus secure to themselves ample returns for their labor at the minimum prices of production.

In the agricultural districts of Europe a rotation is practiced, as a result of this knowledge, confirmed both by practical and scientific experiment as follows: first year, potatoes; second year, wheat; third year, clover; fourth year, wheat, and so on. This rotation, it will be seen, is based entirely upon the action of the nitrogen in the air upon these different plants, and whether they take this important element from the air or from the soil. Lime, potash, and phosphate of lime are properly distributed according to formulas based on the wants of each particular crop. For example: they have found out that wheat, beets, hemp, and generally all the cereals require the most nitrogenized matter, and that peas, beans, horsebeans, clover, sainfoin, vetches, lucern, flax, potatoes, etc., are influenced by a predominating treatment with potash. Corn, artichokes, rutabagas, turnips, radishes, sugar-cane, etc., are influenced favorably by a preponderance of phosphate of lime, while lime itself, although, producing no marked predominating action on plants is necessary everywhere for palpable reasons.

For wheat, the formula is about as follows:

Acid, phosphate of lime,	350 pounds to the acre.
Nitrate of potash,	175 pounds to the acre.
Sulphate of amonia,	220 pounds to the acre.
Sulphate of lime,	310 pounds to the acre.

For Beets.

The nitrate of soda is used in preference to the sulphate of amonia.

For Potatoes.

They dispense with the soda and amonia, and use the nitrate of potash.

For Corn.

The preponderating fertilizer is phosphate of lime. All these results have been obtained by actual experiments based, in the first place, on scientific deductions and suggestions, and the result is that science in farming is reduced to a plain matter of fact, as much so as the science of the engineer, or the almost incomprehensible intricacies of mechanical appliances. The burden of Colonel McClure's address at Erie, constrained the tillers of the soil to study their interests more by learning the exact truths in practical farming, as combined with scientific instruction. All that is practical in farming, and known so well by tradition even to the plow-boy, has a scientific basis—a sensible reason for the custom—else many of these customs would not to-day be so universal, yet the intelligent husbandman has much to learn, and he must learn it in the line of progression, or fall behind all other pursuits in life.

Nothing is more easy than to ascertain practically what is wanting in a soil. It is not necessary that we should go to the analytical chemist with a "bagful" of earth, and pay him a fee of fifty dollars for his services, and be a very little wiser for the outlay. We must learn the secrets of nature ourselves.

Simple trials of culture from year to year, and attentive observation of results, until we become perfectly familiar with the soil we are cultivating, is all that is really necessary. The four cardinal manures, lime, potash, phosphate of lime, and nitrogen, are the only ones we need keep in mind, and we will soon learn what is meant by their soluble and insoluble conditions, and to know the fact, that for any fertilizer to be serviceable, it must be soluble. Knowing, also, the fact that some plants will take from the air all their nitrogen, while others must take it from the soil, a clue is at once given us for subsequent operations.

Numerous text-books on agricultural chemistry, will give the information as to the nature and wants of each family of plants we cultivate, and a half-dozen experiments made practically will determine much to the intelligent farmer. A half-dozen small plots of ground for experimental purposes, will furnish suggestive lessons that will never be forgotten. For example, let the first plot receive a formulated supply of the four cardinal manures; the second, the same, without the supply of any nitrogeneous matters; the third, the same, without the phosphate of lime; the fourth, the same, without potash; the fifth, the same, without any lime, and the sixth contain nothing but the natural soil itself. A careful comparison will indicate what to do in any given case that may be suggested. Rotation in crops, is properly followed, is "fallow" to unproduction and infertility, and this, taken in connection with his experiments with fertilizing agents, a key is furnished the intelligent farmer to his occupation. Barn-yard manures contain all four of these important agents in fertilization; but they must be applied so that they can be absorbed by plants.

Chemical manures as prepared, are more soluble and for purposes of experiment only, would be preferable and give more marked results. Our agricultural schools, yearly, turn out their scores of graduates, apparently schooled in scientiic knowledge; but the great trouble with these young men is, that they possess too much scientific information and know nothing of practice in agricultural chemistry. If a proposition is made to them, they desire to icinerate everything and reduce it to its ultimate analysis before reaching any conclusion. This school knowledge is not as essential for the life we live in, as common sense, mixed with sufficient scientific knowledge to adapt circumstances to the accomplishment of certain practical ends, so as not to hamper the ordinary farmer with technicalities that confuse him and add nothing to his store of already acquired knowledge in the practical part of agriculture. What the average farmer wants, in these days of progression, is the reduction of scientific truth, as established by the schools, into practical axioms, so that he who runs may read them and act at once upon them. In France and Germany the learning of the schools has been formulatad and brought down in this way to the intelligence of the humblest. The earth is universal, and the inhabitants thereof as universal, but it cannot be expected in the nature of things, that all should be pioneers to discover the hidden mysteries of nature, however plain they may appear to be to the ordinary intellect after the secret has been found out. Nor was it so intended by a Divine Providence over us all, else we would have established our individual independence of each other and maintained it. To each member of the human family is allotted a special work, and harmony must ensue, although to each one is given a distinct task.

Soil can never be worked satisfactorily until we learn the nature of it ourselves, and even after fertility to the maximum, for the purposes we design it, is obtained it requires careful watching to maintain it. The requisite ingredients of the soil must be yearly returned to it in some form of fertilizers, as fast as they are removed by the crop grown upon it. To supply the deficiency in a proper attention to these important matters, the air of heaven, the very atmosphere we breathe comes in happily as our natural fertilizer. If this were not so, the fertility of the soil would have ceased long ago, and the earth would now be unfertile. The nitrogen in the air reaches the soil in two ways. It is arrested from the air circulating over the soil, or it is absorbed by the rains and snow in the atmosphere, and thus carried to the earth, where it is held by the clay and carbon in the soil for the use of plants. The power of arresting the nitrogen in the air is not possessed by sand, and here another hint is given the intelligent farmer what to do in the premises.

In short, there can be no limit to the investigations of the practical agriculturist, but at every step of investigation he rejoices to find how easy are the laws of nature to understand, and each day's information only whets the appetite for more, because each day makes everything plainer to him.

It is the business of the practical farmer to learn *nature* as displayed in his soil, and the plants that grow upon it. And when he once understands her, she is a most willing servant, and is ever ready to come to his assistance in any difficulty. *She* invents no technical terms to perplex and confuse him. All she asks is the possession of good practical sense, and a willingness to be taught the simple lessons set before him every day in the year, and every hour in the day he is disposed to devote to the subject. And if he is disposed to be a sluggard, and do nothing for himself but plod along in the well-beaten path of indifference and ignorance, she will not wholly desert him, but will furnish the air of heaven to assist him in making his precarious crop.

DO FERTILIZERS PAY?

By Hon. W. W. REED, *Erie.*

As there is considerable difference of opinion as to whether there is any profit in using fertilizers, I state the results of some experiments that I have made, which may possibly be of interest to farmers.

I sowed 14.49 acres with Lancaster red wheat last fall, and used salt, guano, phosphate, bone dust, and ground lime stone on different sections, leaving 3.83 acres with no fertilizers except a little slacked lime that was intended to make that portion of the field equal in fertility to the other sections before using the fertilizers on them. The result was as follows:

Section one contained 2.28 acres, and had one barrel of salt per acre, costing $1 per acre, sown over the ground after the wheat was drilled in. This yielded 29.6 bushels per acre.

Section two contained 2.09 acres, and had 400 pounds of guano drilled in with the wheat, costing $4 50 per acre. This yielded 29.3 bushels per acre.

Section three contained 2.12 acres, and had 810 pounds of phosphate drilled in with the wheat, costing $7 28 per acre. This yielded 37.5 bushels per acre.

Section four contained 2.11 acres and had 590 pounds of bone dust drilled in with the wheat, costing $5 16 per acre. This yielded 37.7 bushels per acre.

Section five contained 2.06 acres, and had 800 pounds of ground lime stone drilled in with the wheat, costing $1 20 per acre. This yielded 35.7 bushels per acre.

Section six contained 3.83 acres, and had a little slacked lime scattered over it, intended to make it equal in fertility to the other sections before they were fertilized. This yielded 14.3 bushels per acre.

All the above quantities are thresher's measure, and, as the wheat weighs 65 pounds to the bushel, the actual quantity will be from 10 to 15 per cent. more. Assuming that the average of the field without fertilizers would have been 20 bushels per acre, (which is 5.7 bushels per acre more than the yield of the portion not fertilized,) the profit from the use of fertilizers (calling the wheat worth $1 per bushel) is as follows:

For salt, 2.28 acres, at $8 60 per acre profit, ...	$19 61
For guano, 2.09 acres, at $4 80 per acre profit, ...	10 03
For phosphate, 2.12 acres, at $10 22 per acre profit, ...	21 66
For bone dust, 2.11 acres, at $12 54 per acre profit, ...	26 46
For ground lime stone, 2.06 acres, at $14 50 per acre profit, . . .	29 87
Total profit from fertilizers on 10.66 acres, ...	$107 63

This ground was carefully measured and staked off, and the different sections harvested and threshed separately, and every precaution taken to secure accurate results. The field is a clay soil, mixed with some gravel, and has been thoroughly under-drained. It was sown to barley the spring before the wheat was sown, and yielded eighteen bushels per acre. Before the wheat was harvested, the sections on which salt and guano were used, looked equally as well as those sections treated with phosphate, bone dust, and ground limestone; and, if they had not been threshed separately, it would not have been possible, from the appearance of the wheat, to determine which was the best. This fact has convinced me, that the only way to arrive at accurate results is to thresh separately, as in this case. Sections yielding thirty-seven bushels per acre, looked no better than those yielding twenty-nine bushels per acre. I think it is not improbable, that fertilizers have been condemned as useless, in many cases, when, if the grain had been threshed separately, they would have shown favorable results.

In this case, the ground limestone proved to be the most economical fertilizer, showing a profit over bone dust of $1 96 per acre; over phosphate, of $4 28 per acre; over guano, of $9 70 per acre; and over salt, of $5 90 per acre. I am using the ground limestone on about seventy acres of wheat this fall, and hope I may not have occasion to change the opinion formed from the foregoing tests, that, in proportion to cost, it is the best fertilizer for wheat. The field, on which the above tests were made, is being again sown to wheat, with a uniform dressing of one hundred pounds of bone dust, and three hundred pounds of ground limestone, to the acre, and will be again harvested and threshed separately, to ascertain the yield of the different sections the second year.

SYSTEM OF FARM ACCOUNTS.

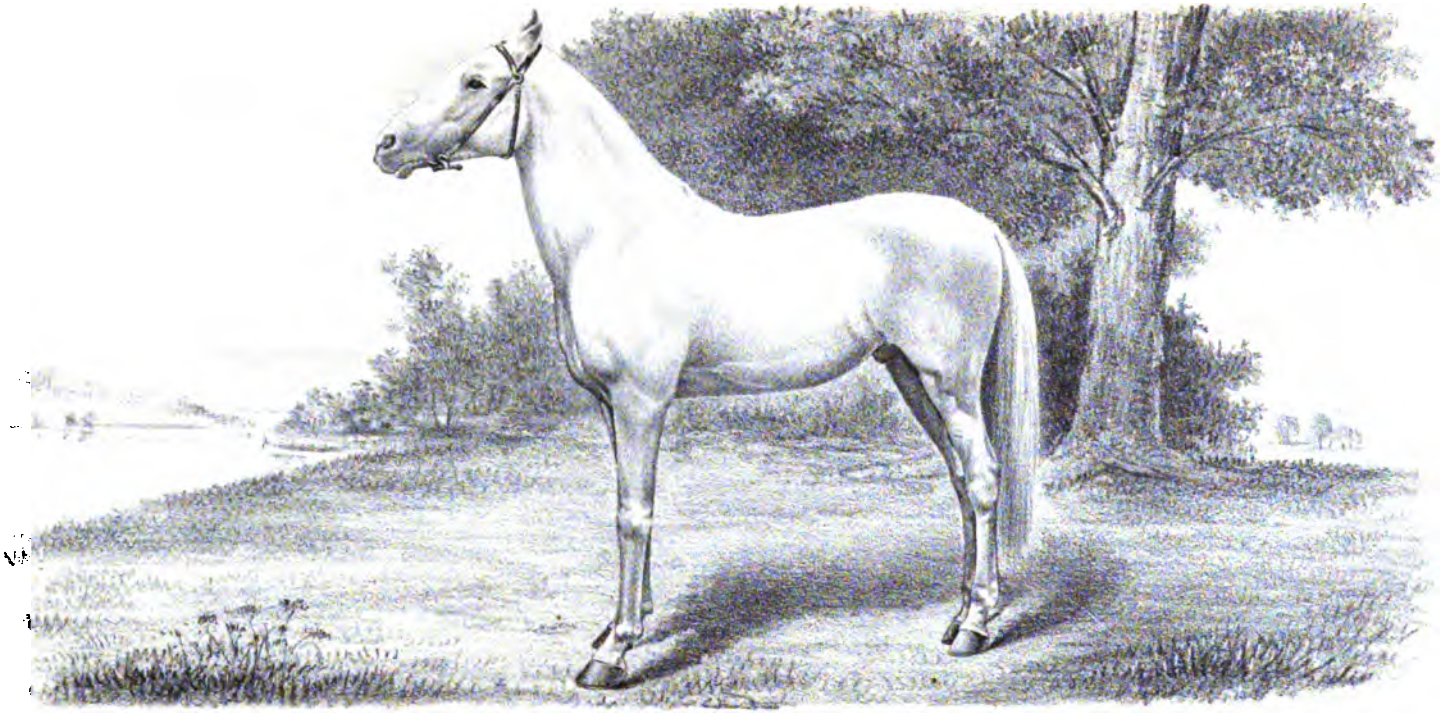
C. J. PENNOCK, *Ithaca, N. Y.*

BLOTTER.

July	2	*Edward Weed*, Dr., *Orchard*, 6 bu. apples, (@ 50, ...	$3	00
	3	*Teams*, Dr., *Farm Products*, 15 bu. oats, (@ 60, ...	9	00
	4	*Contingent Ex.*, Dr., *Cash*, Expenses to Buffalo, ...	6	75
	6	*Thos. Ollifant*, Dr., *Farm Products*, 10 bu. wheat, $1 50, ...	15	00
	7	*Teams*, Dr., *Cash*, Paid La Point's shoeing bill, ...	8	25
	9	*John Smith*, Dr., *Farm Products*, 5 bu. wheat, (@ $1 50, ...	7	50
	10	*Farm Improvements*, Dr., *John Smith*, Building 40 rods fence, (@ 12½c., ...	5	00
	10	*John Bryant*, Dr., *Farm Products*, 60 bu. Oats, (@ 50, ...	30	00
	12	*Stock*, Dr., *Thomas Ollifant*, 1 yearling calf, ...	20	00
	12	*Experiments*, Dr., *Cash*, Paid Gregg for seeds, ...	4	62
	14	*J. Bryant*, Dr., *Teams*, 1 yearling colt, ...	60	00
	14	*Bills Payable*, Dr., *Cash*, Paid Post's printing bill, ...	15	25
	14	*Cash*, Dr., *Bills Receivable*, J. Smith's note paid, ...	876	00
	15	*Cash*, Dr., *Orchard*, Received of Taylor, 16 bu. apples, (@ 40, . .	6	40
Aug.	1	*Wheat Field, '76*, Dr., *Farm Products*, 30 bu. seed, (@ $1 60, ...	48	00

Aug.	3	*Weed*, Dr., *Orchard*,		
		14 bu. apples, @ 37½, ...	$5	25
	4	*Weed*, Dr., *Cash*,		
		To cash, ...	10	00
	7	*Wheat Field*, Dr., *Implements*,		
		Use of reaper, ...	5	00
	9	*Cash*, Dr., *Stock*,		
		Received workman 4 hogs, 700 lb, @ 9, . . .	63	00
	10	*Implements*, Dr., *Cash*,		
		Paid Martindale repair reaper, ...	4	29
	12	*Teams*, Dr., *Cash*,		
		Paid bill repairs, (Terry's), ...	3	68
	12	*Improvements* Dr., *Ollifant*.		
		30 rods road fence, @ 15	4	50
	12	*Hay field*, Dr., *Implements*,		
		Use of mower, ...	20	20
		Use of other tools, ...	5	50
	14	*Stock*, Dr., *F. Products*,		
		100 bu. corn, @ 80, ...	80	00
	14	*Cash*, Dr., *Stock*,		
		Received for milk, July, ...	142	36
	22	*Teams*, Dr., *Farm Preducts*,		
		5 tons timothy hay @ $8 00, ...	40	00
	22	*Stock*, Dr., *Farm Products*,		
		4 tons clover hay @ $7 00, ...	28	00
	24	*Cash*, Dr., *Teams*,		
		1 colt, (received of Bent,)	96	00
Sep.	2	*Ollifant*, Dr., *Orchard*,		
		20 bu. apples, @ 50, ...	10	00
	2	*Stock*, Dr., *Ollifant*,		
		1 pure Braham rooster, ...	1	50
	4	*Cash*, Dr., *Bills Receivable*,		
		D. Anderson's note paid, ...	97	00
	4	*Bills Payable*, Dr., *Cash*,		
		Paid store bill, Chas. Berry, ...	76	00
	8	*Teams*, Dr., *Cash*,		
		Bay horse of T. Jones, ...	160	00

Sep.	9	*Weed*, Dr., *Cash*,		
		To cash, ...	$20	00
	9	*Wheat field*, Dr., *Cash*,		
		Paid threshing 300 bu., @ 5, ...	15	00
	9	*Wheat field*, Dr., *Cash*,		
		Paid for 2 days threshing, (Jones & Bent,) .	4	00
		Paid for use of teams, (Jones & Bent,) . . .	2	00
	9	*Cash*, Dr., *Stock*,		
		Received for milk, (Aug.,)	126	24
	9	*Stock*, Dr., *Farm Products*,		
		11 tons clover hay, @ $7 00, ...	76	00
	14	*Teams*, Dr., *Farm Products*,		
		15 tons timothy hay, @ $8 00, ...	120	00
	15	*Improvements*, Dr., *Cash*,		
		2½ days repair fence, Smith, ...	5	00
		Paid Hayes digging 10 rds. ditch, @ $2 00, .	20	00
	16	*Cash*, Dr., *Farm Improvements*,		
		20 cords wood sold Bent, @ $4 00, ...	80	00
	16	*Improvements*, Dr., *John Bryant*,		
		Cutting and hauling 20 cords wood, @ $2 00,	40	00
	16	*Oat Field*, Dr., *Implements*,		
		Use of tools, ...	15	00
	18	*Cash*, Dr., *Experiments*,		
		70 lbs. cabbage, @ 3, (to Taylor,)	2	10
	18	*Tools*, Dr., *Cash*,		
		Paid LePoint's bill, repair wagon, ...	45	00
	18	*Wheatfield*, (*'76*,) Dr., *Implements*,		
		Use of tools, ...	5	00
	18	*Farm products*, Dr., *Oat Field*,		
		200 bu. oats, @ 60, ...	120	00
	18	*Farm Products*, Dr., *Wheat Field*,		
		120 bu., @ $1 30, ...	156	00
	18	*Farm Products*, Dr., *Hay Field*,		
		35 tons hay, @ $10 00, ...	350	00
	18	*Farm Products*, Dr., *Corn Field*,		
		80 bu. corn, @ 60, ...	48	00
	18	*Cash*, Dr., *Farm Products*,		
		30 bbls. apples, @ $2 50, (Taylor,)	75	00



"WALKER ARABIAN"

Owned by Colin Cameron, *Lancaster Co.*

1st Prize Lancaster, 1875.

Photo. from Life by Hovey, Phila.

WORK REPORT OF EDWARD WEED, FOR JULY, 1875.

	Hay field.	Contingent expenses.	Teams.	Stock.	Farm implements.	Corn field.	Farm improvements.	Wheat field.	Orchard.	Oat field.		
1,	10											
2,	10											
3,	10											
4,	5	5										
5,												
6,			2	2	1	5						
7,						10						
8,						10						
9,						10						
10,			1	3	1		5					
11,						10						
12,												
13,								10				
14,								10				
15,								10				
16,								10				
17,								10				
18,								10				
19,												
20,							3	5	2			
21,								10				
22,		5	1	1	3							
23,								10				
24,								10				
25,								10				
26,												
27,										10		
28,										10		
29,										10		
30,												Absent.
31,										10		
	35	10	4	6	5	45	8	105	2	40	260	

SUMMARY.

	No. of hours.	Price per hour.	Total.		REMARKS,
Teams, ...	4	.15		60	
Hay field, ...	35	"	5	25	
Contingent expenses,	10	"	1	50	
Stock, ...	6	"		90	
Farm implements, .	5	"		75	
Corn field, ...	45	"	6	75	
Farm improvements,	8	"	1	20	
Wheat field, ...	105	"	15	75	
Orchard, ...	2	"	30	30	
Oat field, ...	40	"	6	00	
Total, ...	260	@.15	$39	00	

WORK REPORT OF EDWARD WEED'S TEAM FOR JULY, 1875.

	Hay field.	Contingent expenses.	Teams.	Stock.	Corn field.	Corn field.	Field improvements.	Wheat field.	Orchard.	Oat field.	
1,	10										
2,	10										
3,	10										
4,	5	5									
5,											
6,			2	2	1	5					
7,						10					
8,						10					
9,						10					
10,			1	3			5				
11,						10					
12,											
13,								10			
14,								10			
15,								10			
16,								10			
17,								10			
18,								10			
19,											
20,							3	5	2		
21,								5			
22,											
23,		5						10			
24,								10			
25,								10			
26,								10			
27,											
28,										10	
29,										10	
30,										10	
31,										10	
	35	10	3	5	1	45	8	100	2	40	249

SUMMARY.

	No. of hours.	Price per hour.	Total.	
Hay field, ...	35	@ .20	7	00
Contingent, ...	10	"	2	00
Teams, ...	3	"		60
Stock, ...	5	"	1	00
Implements, ...	1	"		20
Corn field, ...	45	"	9	00
Improvements, . . .	8	"	1	60
Wheat field, ...	100	"	20	00
Orchard, ...	2	"		40
Oat field, ...	40	"	8	00
	249	.20	49	80

WORK REPORT OF EDWARD WEED, FOR AUGUST, 1875.

	Wheat field.	Oat field.	Hay field.	Orchard.	Farm implements.	Farm improvements.	Stock.	Wheat field, 1876.		
1,	10									
2,										
3,		5	5							
4,		10								
5,		10								
6,		10								
7,		10								
8,			10							
9,										
10,			5	5						
11,	10									
12,	10									
13,	10									
14,	10									
15,				2	2		3			Absent, 3.
16,										
17,								10		
18,								10		
19,								10		
20,								10		
21,								10		
22,								10		
23,										
24,					3	1	1	5		
25,								10		
26,				5				5		
27,								10		
28,								10		
29,								10		
30,								5		Extra, *Sunday.*
31,				5						Absent, 5.
	50	45	20	17	5	1	4	115	257	

SUMMARY.

	No. of hours.	Price per hour.	Total.		REMARKS.
		c.			
Wheat field.	50	.15	7	50	
Oat field, ...	45	"	6	75	
Hay field, ...	20	"	3	00	
Orchard, ...	17	"	2	55	
Farm implements, .	5	"		75	
Farm improvements,	1	"		15	
Stock, ...	4	"		60	
Wheat field, 1876, . .	115	"	17	25	
Total, ...	257	.15	38	55	

WORK REPORT OF WEBD'S TEAM, FOR AUGUST, 1875.

	Wheat field.	Oat field.	Hay field.	Orchard.	Farm implements.	Farm improvements.	Stock.	Wheat field, 1876.		
1,	10									
2,										
3,		5	5							
4,		10								
5,		10								
6,		10								
7,		10								
8,			10							
9,										
10,			5	5						
11,	10									
12,	10									
13,	10									
14,	10									
15,				2	2					
16,										
17,								10		
18,								10		
19,								10		
20,								10		
21,								10		
22,								10		
23,							1			
24,								5		
25,								10		
26,								5		
27,								10		
28,								10		
29,								10		
30,										
31,				5						
	50	45	20	12	2		1	110	240	

SUMMARY.

	No. of hours.	Price per hour.	Total.		REMARKS.
Wheat field, ...	50	c.20	10	00	
Oat field, ...	45	"	9	00	
Hay field, ...	20	"	4	00	
Orchard, ...	12	"	2	40	
Farm implements, .	2	"		40	
Farm improvements,		"			
Stock, ...	1	"		20	
Wheat field, 1876, . .	110	"	22	00	
Total, ...	240	c.20	48	00	

Work Report of Edward Weed, for September, 1875.

	Oat field.	Hay field.	Corn field.	Stock.	Teams.	Contingent.	Experiment.	Orchard.	Implements.	Improvements.	Wheat field.	Wheat field, 1876.	
1,	10												
2,	10												
3,	10												
4,	10												
5,	5	5											
6,													
7,		10											
8,					1	4	5						
9,								2	2	6			
10,											10		
11,											10		
12,											10		
13,													
14,			10										
15,				2	1							7	
16,												10	
17,												10	
18,												10	
19,												10	
20,													
21,												10	
22,												10	
23,												10	
24,												10	
25,												10	
26,												10	
27,													
28,			10										
29,			10										
30,				2	2	2	4						
31,													
	45	15	30	4	4	6	9	2	2	6	30	107	260

Summary.

	No. of hours.	Price per hour.	Total.		Remarks.
Oat field, ...	45	c.15	6	75	
Hay field, ...	15	"	2	25	
Corn field, ...	30	"	4	50	
Stock, ...	4	"		60	
Teams, ...	4	"		60	
Contingent, ...	6	"		90	
Experiments, ...	9	"	1	35	
Orchard, ...	2	"		30	
Implements, ...	2	"		30	
Improvements, . . .	6	"		90	
Wheat field, ...	30	"	4	50	
Wheat field, 1876, . .	107	"	16	05	
	260	c.15	39	00	

WORK REPORT OF WEEDS' TEAM, FOR SEPTEMBER, 1875.

	Oat field.	Hay field.	Corn field.	Stock.	Teams.	Contingent.	Experiments.	Orchard.	Implements.	Improvements.	Wheat field.	Wheat field, 1876.	
1,	10												
2,	10												
3,	10												
4,	10												
5,	5	5											
6,													
7,		10											
8,						4	5						
9,								2	2	6			
10,											10		
11,											10		
12,											10		
13,													
14,			10										
15,				2	1							7	
16,												10	
17,												10	
18,												10	
19,												10	
20,													
21,												10	
22,												10	
23,												10	
24,												10	
25,												10	
26,												10	
27,													
28,													
29,													
30,				2	2	2	4						
31,													
	45	15	10	4	3	6	9	2	2	6	30	107	239

SUMMARY.

	No. of hours.	Price per hour.	Total.		REMARKS.
Oat field, ...	45	.20	9	00	
Hay field, ...	15	"	3	00	
Corn field, ...	10	"	2	00	
Stock, ...	4	"		80	
Teams, ...	3	"		60	
Contingent, ...	6	"	1	20	
Experiments, ...	9	"	1	80	
Orchard, ...	2	"		40	
Implements, ...	2	"		40	
Improvements, ...	6	"	1	20	
Wheat field, . . .	30	"	6	00	
Wheat field, 1876, . .	107	"	21	40	
	239	c.20	47	80	

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TEAMS.

Dr.

	To inventory,	$555	00
	" labor, (July,)	1	20
July 3,	" oats,	9	00
" 7,	" cash,	8	25
Aug. 12,	" "	3	68
" 22,	" hay,	40	00
	" labor, (Sep.,)	1	20
Sep. 8,	" horse,	160	00
" 14,	" hay,	120	00
		$898	33

3

STOCK.

Dr.

	To inventory,	$1,015	00
	" labor, (July,)	1	90
July 12,	" calf,	20	00
	To labor, (Aug.,)		80
Aug. 14,	To corn,	80	00
" 22,	" hay,	28	00
	" labor, (Sep.,)	1	40
Sep. 2,	" rooster,	1	50
" 9,	" hay,	77	00
	To balance,	156	00
		$1,381	60

5

F. IMPROVEMENTS.

Dr.

	To labor, (July,)	$2	80
July 10,	To J. Smith,	5	00
	To labor, (Aug.,)		15
Aug. 12,	To Ollifant,	4	50
	" labor, (Sep.,)	2	10
Sep. 15,	" cash,	25	00
" 16,	" Bryant,	40	00
	To balance,		45
		$80	00

TEAMS. Cr. 2

	By labor,	$49	80
July 14,	" colt,	60	00
Aug. 24,	" "	96	00
	" labor, (Aug.,)	48	00
	" " (Sep.,)	47	80
	By inventory,	585	00
	By balance,	11	73
		$898	33

STOCK. Cr. 4

Aug. 9,	By hogs,	63	00
" 14,	" milk,	142	36
Sep. 9,	" "	126	24
	By inventory,	1,050	00
		$1,381	60

FARM IMPROVEMENTS. Cr. 6

Sep. 16,	By wood,	$80	00
		$80	00

7 **F. PRODUCTS.** Dr.

	To inventory, ...	$1,175	00
Sep. 18,	" oats, ...	120	00
" "	" wheat, ...	156	00
" "	" hay, ...	350	00
" "	" corn, ...	48	00
		$1,849	00

9 **BILLS REC'BLE.** Dr.

	To inventory, ...	$720	50
		$720	50

11 **BILLS PAYABLE.** Dr.

July 14,	To cash, ...	$15	25
Sep. 4,	" "	76	00
	To inventory, ...	37	45
		$128	70

13 **EDWARD WEED.** Dr.

July 2,	To apples, ...	$3	00
Aug. 3,	" "	5	25
" 4,	" cash, ...	10	00
Sep. 9,	" "	20	00
	To balance, ...	78	30
		$116	55

F. Products. Cr. *8*

July 3,	By oats,	$9	00
July 6,	“ wheat,	15	00
“ 9,	“ “	7	50
“ 10,	“ oats,	30	00
Aug. 1,	“ seed wheat,	48	00
“ 14,	“ corn,	80	00
“ 22,	“ hay,	40	00
“ “	“ “	28	00
Sep. 9,	“ “	77	00
“ 14,	“ “	120	00
“ 18,	“ apples,	75	00
	By inventory,	1,319	50
		$1,849	00

Bills Rec'ble. Cr. *10*

July 14,	By note paid,	$376	00
Sep. 4,	“ “ “	97	00
	By inventory,	247	50
		$720	50

Bills Payable. Cr. *12*

	By inventory,	$128	70
		$128	70

Edward Weed. Cr. *14*

	By labor, (July,)	$39	00
	“ “ (Aug.,)	38	55
	“ “ (Sep.,)	39	00
		$116	55

15 THO'S OLLIFANT. Dr.

July 6,	To wheat, ...	$15	00
Sep. 2,	" apples, ...	10	00
	To balance, ...	1	00
		$26	00

17 J. SMITH. Dr.

July 9,	To wheat, ...	$7	50
		$7	50

19 CONT'G'T EXPENSES. Dr.

	To labor, (July,)	$3	50
July 4,	" cash, ...	6	75
	" labor, (Sep.,)	2	10
		$12	35

21 FARM IMPLEMENTS. Dr.

	To labor, (July,)		95
	To inventory, ...	$499	50
	" labor, (Aug.,)	1	15
Aug. 10,	" repairs, ...	4	29
	" labor, (Sep.,)		70
Sep. 18,	" repairs, ...	45	00
		$551	59

23 JAS. BRYANT. Dr.

July 10,	To oats, ...	$30	00
" 14,	" colt, ...	60	00
		$90	00

THO'S OLLIFANT. Cr. *16*

July 12,	By calf,	$20	00
Aug. 12,	" labor,	4	50
Sep. 2,	" rooster,	1	50
		$26	00

J. SMITH. Cr. *18*

July 10,	By work,	$5	00
	By balance,	2	50
		$7	50

CONT'G'T EXPENSES. Cr. *20*

	By balance,	$12	35
		$12	35

FARM IMPLEMENTS. Cr. *22*

Aug. 7,	Use of reaper,	$5	00
" 12,	" " tools,	25	70
Sep. 16,	" " "	15	00
" 18,	" " "	15	00
	By inventory,	435	40
	By balance,	55	49
		$551	59

JAS. BRYANT. Cr. *24*

Sep. 16,	By labor,	$40	00
	By balance,	50	00
		$90	00

25 CASH. Dr.

	To inventory,	$376	40
July 14,	" Smith's note, p'd,	376	00
" 15,	" cash,	6	40
Aug. 9,	" "	63	00
" 14,	" "	142	36
" 24,	" "	96	00
Sep. 4,	" note pd.,	97	00
" 9,	" cash,	126	24
" 16,	" "	80	00
" 18,	" "	2	10
" "	" "	75	00
		$1,440	50

27 OAT FIELD. Dr.

	To labor, (July,)	$14	00
	" " (Aug.,)	15	75
	" " (Sep.,)	15	75
Sep. 16,	" tools,	15	00
	To balance,	59	50
		$120	00

29 WHEAT FIELD. Dr.

	To labor, (July,)	$35	75
	" " (Aug.,)	17	50
Aug. 7,	" use of reaper,	5	00
	" labor, (Sep.,)	10	50
Sep.	" cash,	21	00
	To balance,	66	25
		$156	00

CASH. Cr. 26

July 4,	By cash,	$6	75
" 7,	" "	8	25
" 12,	" "	4	62
" 14,	" "	15	25
Aug. 4,	" "	10	00
" 10,	" "	4	29
" 12,	" "	3	68
Sep. 4,	" "	76	00
" 8,	" "	160	00
" 9,	" "	20	00
" "	" "	21	00
" 15,	" "	25	00
" 18,	" "	45	00
	By inventory,	1,040	66
		$1,440	50

OAT FIELD. Cr. 28

Sep. 18,	By oats,	$120	00
		$120	00

WHEAT FIELD. Cr. 30

Sep. 18,	By wheat,	$156	00
		$156	00

31 HAY FIELD. Dr.

	To labor, (July,)	$12	25
	" " (Aug.,)	7	00
Aug. 12,	" use of tools,	25	70
	" labor, (Sep.,)	5	25
	To balance,	299	80
		$350	00

33 CORN FIELD. Dr.

	To labor, (July,)	$15	75
	" " (Aug.,)	9	00
	" " (Sep.,)	6	50
	" balance,	25	75
		$48	00

35 EXPERIMENTS. Dr.

July 12,	To cash,	$4	62
	" labor, (Sep.,)	3	15
		$7	77

37 ORCHARD. Dr.

	To labor, (July,)		70
	" " (Aug.,)	$4	94
	" " (Sep.,)		70
	By error,		02
	To balance,	18	30
		$24	66

39 WHEAT FIELD, '76. Dr.

	To labor, (Aug.,)	$39	25
Aug. 1,	" seed,	48	00
	" labor, (Sep.,)	37	45
Sep. 18,	" use of tools,	15	00
		$139	70

Hay Field. Cr. *32*

Sep. 18,	By hay, ...	$350	00
		$350	00

Corn Field. Cr. *34*

Sep. 18,	By corn	$48	00
		$48	00

Experiments. Cr. *36*

Sep. 18,	By cabbage, ...	$2	10
	" balance, ...	5	67
		$7	77

Orchard. Cr. *38*

July 2,	By apples, ...	$3	00
" 15,	" "	6	40
	" error to labor, Aug., ...		01
Aug. 3,	" apples, ...	5	25
Sep. 2,	" "	10	00
		$24	66

Wheat Field, '76. Cr. *40*

	By balance, ...	$139	70
		$139	70

PROFIT AND LOSS.

	Assets.	*Dr.*			*Liabilities.*	*Cr.*	
July 1,	Inventory teams, ...	555	00	July 1,	Bills payable, .	128	70
	" stock, ...	1,015	00				
	" implements, . .	499	50				
	" farm products, . .	1,175	00				
	" bills receivable, .	720	50				
	" cash on hand, . .	376	40		By balance, . .	4,212	70
		4,341	40			4,341	40

	Liabilities.	*Dr.*			*Assets.*	*Cr.*	
Oct. 1,	Henry Bell, . .	37	45	Oct. 1,	Inventory teams, ...	585	00
	Ed. Weed, . . .	78	30		" stock, ...	1,050	00
	Tos. Ollifant, . .	1	00		" implements, . .	435	40
					" bills receivable, .	247	50
					" cash on hand, . .	1,040	66
					" farm products, . .	1,319	50
					" book account, . .	52	50
	To balance, . .	4,753	51		Wheat field, 1876, ...	139	70
						4,870	26

To balance, ...	4,753	51	By balance, ...	4,212	70
			" gain, ...	540	81
	4,753	51		4,753	51

C. J. PENNOCK. 3—15—1876.

INVENTORY TAKEN THIS 1ST DAY OF FEBRUARY, 1876.

Teams.				
1 Grey mare, "Nell," 10 years,	$100	00		
1 Grey horse, "Jim," 12 "	80	00		
1 Bay " "Dodger," 5 "	225	00		
1 " mare, "Gip," 10 "	100	00		
2 Setts double harness, @ $20 and $30,	50	00		
			$555	00
Stock.				
5 Milch cows, @ $40,	$200	00		
4 " " @ $35,	140	00		
1 Yoke work cattle, 7 years,	200	00		
2 Yearling heifers, @ $15,	30	00		
1 Steer, 1 year,	25	00		
1 Short-horn bull,	150	00		
3 Brood sows, @ $30,	90	00		
1 Stock hog,	30	00		
15 Store pigs, @ $10,	150	00		
			$1,015	00
Implements.				
1 Burdick reaper,	$125	00		
1 Buckeye mower,	100	00		
2 Plows, @ $5 and $8,	13	00		
1 Double harrow,	12	00		
1 Grain drill,	50	00		
1 Farm wagon and double trees,	75	00		
1 " " " "	50	00		
1 Light "	30	00		
2 Pick axes,	2	00		
1 Steel square,	1	50		
1 Hand-saw,	1	75		
1 Hammer, (claw,)		75		
2 Corn hoes,	1	00		
2 Spades,	2	25		
1 English shovel,	1	00		
1 Round-pointed shovel,	1	25		
10 Grain sacks, @ 30c.,	3	00		
4 Hay forks,	3	00		
1 Manure fork,	1	25		
1 Horse hay fork, rope, &c.,	25	00		
2 Measures, ½ bu., 50c., ¼ bu., 25c.,		75		
			$499	50
Farm Products.				
420 Bu. wheat, @ $1 50,	$630	00		
200 Bu. oats, @ 40c.,	80	00		
20 Tons timothy hay, @ $8 00,	160	00		
15 " clover " @ $7 00,	105	00		
200 Bu. corn, @ 70c.,	140	00		
100 Bu. apples, @ 60c.,	60	00		
			$1,175	00
When given. *Bills Receivable.*				
Dec. 10, 1874, Note of Jas. Burroughs, (1 year,)	$162	25		
Feb. 15, 1875, " " John Smith, (10 mos.,)	376	00		

Mar. 8, 1875, Note of D. Anderson, (12 mos.,)	$97	00		
" 26, 1875, " " P. Malendy, (18 "	85	25		
			$920	50
Bills Payable.				
Store bill, Chas. Berry, ...	$76	00		
Grocery " Henry Bell, ...	37	45		
Printing " of Melvin Fost, ...	15	25		
			$128	70
Bank Account.—Cash.				
Cash on hand, ...			$376	40
Summary.				
Teams, ...	$555	00		
Stock, ...	1,015	00		
Implements, ...	499	50		
Farm products, ...	1,175	00		
Bills receivable, ...	720	50		
Cash, ...	376	40		
	$4,341	40		
Less bills payable, ...	128	70		
			$4,212	70

INVENTORY No. 2.

Teams.				
1 Grey mare, "Nell," 11 years, ...	$90	00		
1 " horse, "Jim," 13 years, ...	70	00		
1 Bay " "Dodger," 6 "	235	00		
1 " mare, "Gip," 11 "	90	00		
1 Colt, ...	60	00		
2 Setts double harness, @ $15 and $25, . . .	40	00		
			$585	00
Stock.				
5 Milch cows, @ $40, ...	$200	00		
4 " " @ $37 50, ...	150	00		
1 yoke work cattle, 7 years, ...	220	00		
2 Two year old heifers, @ $25, ...	50	00		
1 Three " " steer, ...	40	00		
1 Short-horn bull, ...	200	00		
2 Brood sows, @ $30, ...	60	00		
1 stock hog, ...	30	00		
5 hogs, @ $20, ...	100	00		
			$1,050	00
Cash.				
On hand, ...			$1,040	66
Bills Payable.				
Henry Bell's, ...			$37	45
Implements.				
1 Burdick reaper, ...	$100	00		
1 Buckeye mower, ...	75	00		
2 Plows, @ 0 and $5, ...	5	00		

1 double harrow,	$10	00		
1 Grain drill,	45	00		
1 Farm wagon and double trees,	65	00		
1 " "	80	00		
1 Light "	20	00		
2 Pick axes,	2	00		
1 Steel square,	1	40		
1 Handsaw,	1	50		
1 Hammer,		75		
2 Corn hoes,		50		
2 Spades,	2	00		
1 English shovel,		75		
1 Round pointed shovel,	1	00		
8 Grain sacks, @ 25c.,	2	00		
3 Hay forks,	2	00		
1 Manure fork,	1	00		
1 Horse hay " &c.,	20	00		
2 Measures, ½ and ¼ bu.		50		
			$435	40
Farm Products.				
200 Bu. oats, (new,) @ 60c.,	$120	00		
125 Bu. oats, (old,) @ 60c.,	75	00		
120 Bu. wheat, (new,) @ $1 30,	156	00		
375 Bu. wheat, (old,) @ $1 33,	500	50		
100 Bu. corn, (old,) @ 70c.,	70	00		
80 Bu. corn, (new,) @ 60c.,	48	00		
35 Tons hay, @ $10,	350	00		
			$1,319	50
Bills Receivable.				
Jas. Burrough's note,	$162	25		
Peter Malendy's note,	85	25		
			$247	50

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PENNSYLVANIA AGRICULTURAL SOCIETY.

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TRANSACTIONS

OF THE

PENNSYLVANIA STATE DAIRYMEN'S ASSOCIATION.

1878.

LIST OF OFFICERS FOR 1878.

President, A. M. Fuller, Meadville.
Treasurer, S. B. Dick, Meadville.
Recording Secretary, H. Cooley Greene, Meadville.
Corresponding Secretary, J. M. Bigger, Cambridge borough.

Vice Presidents.

John Cole,	Venango.
M. H. Terry,	Waterford.
John Fuller,	Harmonsburg.
J. B. Wilbur,	Cambridge borough.
J. H. Reall,	New York.
H. C. King,	Spring.
T. C. Cochran,	Sheakleyville.
Honorable Eastburn Reeder,	Bucks county.
G. W. Carroll,	Union City.
William Nash,	Crossingville.
I. R. Hall,	Randolph.
Dean Parker,	Erie.
Honorable S. H. Findley,	Atlantic.
H. Canfield,	Mill Village.
A. H. Bates,	Penn Line.
D. H. Nodine,	Cochranton.
Honorable S. E. Kincaid,	Wayne.
William Morse,	New Richmond.
F. Giddings,	Venango borough.
W. W. Power,	Conneautville.

CONSTITUTION.

(Adopted April 13, 1871.)

SECTION 1. This organization shall be called the Pennsylvania State Dairymen's Association.

2. Its purpose shall be to improve and develop the dairy interest of Pennsylvania.

3. Its membership shall consist of such persons as shall pay the sum of one dollar annually, and of honorary members.

4. The payment of five dollars shall constitute a paid up life membership.

5. Its officers shall consist of a President, twenty Vice Presidents, Treasurer, Recording Secretary, and Corresponding Secretary. These, including the first three Vice Presidents, shall constitute the executive board, and shall have the oversight of the affairs of the association, the appointment of its meetings, and all arrangements for the same.

6. The annual meeting, for the election of officers, shall be held on the last Wednesday of each year, at such place as may be designated by the executive board.

7. It shall be the duty of the Secretary to keep and prepare for publication the transactions of all meetings of the association each current year, embracing such papers as shall be approved by the executive board. The Treasurer shall keep and disburse the funds of the association on the order of the Secretary, countersigned by the President, and to report receipts and expenditures at the annual meeting. It shall be the duty of the Corresponding Secretary to conduct the correspondence, and assist the executive board in such way as they may require.

8. Amendments to this constitution may be made at any annual meeting by a two thirds vote of the members present.

INTRODUCTION.

The remarkable growth of the dairy industry since 1860 is a matter interesting to all readers of agricultural literature.

Within a few years the dairy has taken quiet possession of vast areas of territory from which it had been excluded by natural disqualifications. Poorly watered, and therefore poorly adapted to dairying, the lack of springs has been remedied by the introduction of artesian wells and windmills. Western enterprise has stocked western farms with herds of fine bred dairy cows. Freights have been secured from Chicago at even less rates than from New York, and thus the great West is placed in favorable competition with the older sections of the East.

While the finances of our country have been in an unsettled state, and business of every kind has been depressed, the dairy has been the last to feel the pressure inevitable to the settling of currency values, from the inflation of war times, to a normal specie basis.

In 1877, prices of cheese ranged higher, as compared with gold values, than ever before.

The depression of prices in 1878, came a year or two later than was expected, and finds the dairymen, in a measure, prepared for the change. Even now the dairy is fairly remunerative.

The rapid development of dairying with the adoption of new methods, devices, and machinery, and the lively competition resulting therefrom, have rendered it necessary for dairymen to study carefully the details of their business, and avail themselves of every source of information.

Oleomargarine, an invention well calculated to take the place of poor butter, is being put upon the markets of this and other countries, and its effect is already seriously felt in lower prices of all common grades of butter.

To meet these competitive forces, dairymen must be awake and alive to their interests, and this demand for wakefulness has its compensation in the growth of general intelligence.

Organization is the great drive wheel of progress. By means of organized efforts, an interchange of ideas, facts, and experiences has been effected, that has greatly enhanced the standard of intelligence of the dairy public.

A new literature has been developed through the labors of *dairymen's associations* by which the best fruits of the experiments and investigations of science have become the property of every dairyman who will read.

In view of the foregoing facts, the following pages are offered to the readers of this volume, by the secretary of the *Pennsylvania State Dairymen's Association*, as his share of the contribution to current dairy literature for the year 1878, hoping and believing that some of the ideas embodied therein, will fall upon good ground, and stimulate the reader to successful efforts in his calling.

H. COOLEY GREENE,
Secretary.

FOURTH ANNUAL MEETING.

COURT-HOUSE, MEADVILLE, *January 16, 1878.*

The opening session this afternoon was well attended, there being about one hundred and fifty members and interested parties present, all wearing that pleasant countenance which denotes the degree of happiness always enjoyed by those who enjoy the blessing of prosperity, gained by a faithful pursuance of honorable and commendable callings.

The Association was called to order at two o'clock and forty-five minutes P. M., by the President, A. M. FULLER, who said, by way of introduction, that he was glad to see so many familiar faces present. He could recall no instance of death having entered the ranks of the Association during the year that had passed. He urged the necessity of all members taking an active part in sustaining the finances of the Association.

The President then announced the following committees:

Committee on Nominations—John Cole, Ira R. Hall, William Nash, John Fuller, H. C. King, H. Canfield, M. W. Terry. *Committee on Dairy Utensils* E. Reeder, H. Lewis, of N. Y., D. H. Gibson. *Finance Committee*—Gustavus Bently, S. A. Farrington, I. W. Allee, T. T. Root, John Fuller.

The minutes of the last meeting were read by the Secretary, and approved.

Ten minutes time was then given to the Finance Committee to attend to the sale of the membership tickets for the coming year.

ADDRESS BY MR. FULLER, PRESIDENT OF THE ASSOCIATION.

GENTLEMEN:—We are again met in annual convention at the close of an unusually prosperous year in the dairy business, and, in many respects, one of the most eventful to us in the history of the interest in this section. A brief review of the experiences of the past season, together with its bearing upon our future prospects, seems to be all that is necessary at this time. The season opened with misgivings on the part of many, as to the probability of securing satisfactory prices for the season's product, an event which would have resulted in discouragement to many who have recently embarked in the business and who constitute the rank and file of the dairy interest; but happily we have experienced an unusually prosperous season, with an average yield and full prices, and in comparison with other farm industries, the cheese business stands to-day preëminent, in point of profit, reputation, and stability. In view of all this, it might be well to look closely to the causes which have resulted in this unexpected but very satisfactory condition of the interest.

The amount of cheese manufactured in 1877, has exceeded by about one sixth the largest amount made in any one year, and in view of this increased production, I can scarcely account for the fact that the demand has kept pace with the supply, though it may be accounted for partially in the increased home consumption of cheese. Our cheese is certainly taking a high rank and securing a firm foothold in the esteem of our English brethren. I believe that the cheese export trade will in the future continue to steadily increase, not only in this direction, but that as yet undeveloped territory will be opened up by capital and enterprise to an increased export of our dairy products. I would suggest further, that the satisfactory business of the past season must be attributed, in part, to the unity of the interest. Prices here have ruled very near to the highest quotations in the eastern markets, which would not have been the case had there been a lack of coöperation on the part of salesmen; furthermore, had there existed no board of trade in connection with the interest, there would have remained unsold in this section, on the 1st of December, probably ten thousand boxes of cheese, instead of two thousand. It is unnecessary at this late day to urge the advantages to be derived from coöperation upon the part of all who are engaged in the business, and it were well if this fact could be indelibly stamped upon the mind of every man, whether he be salesman, factoryman, manufacturer, or patron. We have thus briefly reviewed the experiences of the past season, and I have endeavored to give prominence to those points, which I consider have contributed largely to our success.

I now invite your attention to the consideration of matters essential to our continued progress and prosperity. In this connection I am led to consider the following questions: By what means have we secured our present enviable position among the dairy sections of this country? What has contributed to dispel the prejudice that formerly existed against Pennsylvania cheese? What course is necessary to our further progress? I think we may solve the questions in these few words:—"judicious advertising," "first quality goods." The starting point is this association, which has been so generously supported by the interest. Each year has witnessed an increasing desire upon the part of our more enterprising dairymen to avail themselves of a more extended and careful study of the business. The association has been the medium by which we have been enabled not only to receive instruction from able teachers, but to render each to each the benefits of our own observation and experience; more than this, it has exerted an influence for good in uniting us in our efforts to more completely systematize the business. Through the association we have been enabled to sucessfully organize a board of trade for the sale of cheese. Had this latter organization not existed, we should probably have waited until the next centennial before Pennsylvania would have been represented in dairy products. To the board of trade is due the credit of the cheese fair held here in October, the first of the kind held in the United States, also the credit of securing us a representation in December last at the Chicago fair. The influences which spring from great exertion and unusual activity on the part of any enterprise assures its introduction; its subsequent seccess depends upon the merit of the enterprise, and in this case upon the merit of the article introduced, and this brings us to the consideration of our second point,—"first quality goods." We must assume that the frequent and favorable mention of our attainments and progress by the press has done much for us, but this has been secured primarily by the intrinsic merit of our product. The excellency of our goods, where ever exhibited, has given us a reputation which can only be rendered permanent by maintaining the quality of goods. A life of good deeds is frequently forgotten in one misstep, hence, unless we adhere closely to the lessons of the past, and admit the fact that desirable goods are more to our credit than undesirable, the reputation already won will stand us as nothing. You may call this an argument against a tendency on the part of some manufacturers to increase the quality of skim cheese made in this section. Consider it in any light you choose, and with all due respect to those who may entertain different views, I assert that so surely as you drift in this direction and increase the amount of inferior cheese disproportionately to the amount of fine goods made, a temporary gain may be the result, yet your folly will be apparent in the end. Look to New York State, in relation to whom you stand to-day second in point of reputation for the manufacture of the best cheese the country affords. Consider how carefully she guards and maintains her reputation.

Look at Ohio, who perhaps is more to be pitied than blamed; her reputation in the manufacture of cheese is not the envy of any section, and consider whether the field for the production of inferior goods is not already sufficiently extended. The most important point, however, in the discussion of this subject is this: the business must be considered not in reference to the special course of any particular section as affecting the business, but as a whole, with Canada included, for we find the lion and the unicorn prove no insignificant competitors in the cheese export trade of this country. Should excessive competition in the business overtake you, it will be with cheese as it is with butter and all manufactures; the inferior goods suffer the greater loss, and it is safe to assert, that in cheese it is an utter impossibility to produce fine goods to such an extent as to overload the market; hence, in order to be able to cope with the excessive competition which must come sooner or later in this business, the interest in this section must stand by the reputation already won, and in it they will possess a bulwark of safety, eventually making this dairy section as noted in the markets of Europe as any in this country. In this connection it seems proper to discuss the future prospects of the industry. I have eulogized to some extent the management of the business in this section during what may be considered the most prosperous year of the interest, and have advocated the necessity of a strict adherence to the only course that can be said to promise safety and stability to the business. Assuming then, that the business is established upon a firm basis, I think it would be best not to gild the picture too highly. There is one very important matter closely connected with its future prosperity and progress that demands attention. I do not wish to stand in the position of censor for the interest, but feel that the presentation of this subject by one not directly interested in the business will lead to no misapprehension as to my object in doing so. I desire to call your attention to the necessity for a better understanding among factorymen in regard to their patrons and the positions, I believe patrons should assume in the matter. The principal evil connected with the management of the business at present, and one which threatens to work to its detriment, is the common practice among factorymen of buying milk in order to secure a large patronage, resulting in all cases to the injury of neighboring factories, and in but few instances to the benefit of the purchaser. I do not deny that this may be done to a limited extent and yet prove no damage to the interest, but the practice is being carried to excess. I will endeavor to point out the probable result if the present course is persisted in. In brief, it will have a tendency to discourage and drive from the business the very class of men we most need, men whose intelligence, experience, integrity, and business ability peculiarly fit them for the satisfactory management of the business. This practice is no less than speculation in its worst phase, it is demoralizing in its effect upon patrons, is productive of dissension, and must eventually result in the ruin of every factoryman who persists in following this course. To patrons, I would say, the support and success of your home factory is the greatest guarantee of your future profit in the business. If a distant factory declares a larger dividend, or offers you a cash inducement, or an extreme price per hundred for your milk, if led away by these inducements, and it results in the ruin of your home factory, depend upon it, you will answer in the end that you have been but penny wise.

Should your salesman, by neglecting to move your cheese at the proper time, or by selling at an unfavorable time, using his best judgment in the matter, incur loss, and thereby secure a smaller return than a neighboring factory, do not desert your own factory, for, in nine cases out of ten, the success of your rival is due, oftener, to chance than foresight, and the reverse may occur in another season. The course that would seem best for patrons to adopt, is this: organize your factory upon the best possible basis, secure a skilled cheese-maker, elect a competent salesman, and a good business manager for your secretary. If you do not succeed the first year in securing the highest dividend possible, aim to do better upon a second trial, and, even if you should never attain the maximum of success, in the end, your interest will be best subserved by sustaining your home factory. Some argue, that we have more factories than the business requires, hence undue competition. This will, no doubt, be remedied when the business becomes more fully established; but patrons are sadly in fault, if they do not aid in maintaining the equilibrium, and thereby encourage, and retain in their service, men in whom they have confidence, and who are not willing to disregard the course that prudence and good business management would dictate. In regard to the probability of greater competition in the dairy business, in the future, I would call your attention to the fact, that the dairy business has proved, during the past five years, to be one of the most profitable branches of farming in this country. The great West is fully aroused to its importance, and to the advantages and profit to be gained by entering into the manufacture of cheese and butter, representing, as they do, more value in a given bulk than any other product of the farm. When it is stated, that one car load of butter is worth thirty car loads of grain, and one car load of cheese is equal to fifteen car loads of corn, you can readily understand that we may expect a rapid development of the business, in those portions of the West which are best adapted to it. From this, I argue, that we may reasonably expect greater competition and an increased production in the future, which must result in lessened prices.

Dairy products have suffered little in comparison with other products from the gradual depreciation of values since the panic of 1873. Other manufactures, articles of export, and farm products, have more nearly reached the level of a specie basis. Hence, let us consider that in the dairy business the past is not a guarantee for the future. We may rest assured, however, that if cheese and butter experience a reduction in price, it will be because other staple articles of food are relatively cheaper, though in the event of lower prices we may look for an increased consumption of dairy products.

In closing, I desire to call your attention to the very satisfactory reports of our Secretary and Treasurer, regarding the present condition of the association. It will be noticed that we are in a favorable position for effective work. What remains yet to be accomplished should encourage us to renewed effort in sustaining and adding to the influence of so important a factor in the bussiness. The Treasurer's report should be a source of congratulation to the association. Few similar organizations throughout the country, are able to say " of funds we have plenty," but rather " of funds we have need." To meet the expenses of this organization for the coming year, it will be necessary that you contribute liberally. I know that it is the common remark among factory-men, that they are obliged to furnish the major portion of the means necessary to its maintenance. Allow me to say that I consider they have been well re-paid for their efforts in the past, yet this does not relieve patrons of the obligation which rests upon them to assist in this matter. Ten years of isolated effort and its consequent inactivity would not have accomplished for the interest what the association has in the past few years. Let the interest then awaken to the importance of united effort in this enterprise, and future generations of cheesemakers will rise up and call you blessed.

Mr. John Cole, of Cussewago, was introduced, and spoke as follows, upon the subject of

INFLUENCE OF THE DAIRY BUSINESS UPON THE FARMING COMMUNITY.

Mr. President, Ladies, and Gentlemen: The dairy industry of northwestern Pennsylvania has become the leading business, particularly in Crawford county, and its influence is seen and felt, not only among that class of the community who are engaged in the manufacture of dairy products, but in all departments of industry. The merchant, the miner, the mechanic, and the professional man, all feel its influence and share its benefits, because whenever one branch of industry is more profitable than another, and moves steadily along without any material change, and brings a large amount of money into the country, then all classes seem to prosper. While all other industries of the United States, for the last few years, have been very much depressed, and many of them at a dead-lock, manufactured goods selling at ruinously low prices, even less than first cost, the manufacturers going into bankruptcy, and thousands upon thousands of workmen thrown out of employment and compelled to turn their attention somewhere else in order to support their families, the dairy industry during all this time has moved steadily along, cheese and butter selling for all that they are worth, and in some cases, I have thought, more. The dairy sections of the United States have all prospered and increased in wealth, and the dairymen have added to their farms and their herds. While they have prospered, all other classes of people are made to feel glad. Yet, Mr. President, there is something lacking in the dairy business in this section, particularly in the factory system. It is of very recent date, and dairymen are not educated up to that degree of proficiency that they should be. While we have produced many fine cheese, we have also produced very many that were not first class, and this fault has generally been placed upon the dairy. Whenever patrons of cheese factories learn to deliver their milk at the factory as it should be then we will have less poor cheese. The skimming process I will leave to others, but cleanliness in all things that belong to the dairy is of the first importance. Cleanliness should be strictly adhered to in all departments of cheese-making. It will not only benefit the cheese interest, but its influence will be felt very soon, inducing all connected therewith to practice cleanliness in all the walks of life. The influence of the dairy business cannot fail to be for good in many ways. It not only induces the farmer to practice cleanliness, but it encourages him to the practice of punctuality. It not only enriches the land more rapidly than any other kind of business which the farmer can engage in, but it brings untold and almost unlimited wealth to the great army of farmers who give dairying their first attention. There are, in fact, many ways, readily suggested to the mind of every one, in which the dairy business influences mankind and the country, and I need not enumerate them. Others are prepared to speak upon this subject, and I prefer to hear, rather than be heard.

Mr. JOHN FULLER, of Harmonsburg, spoke upon the same subject, as follows:

Mr. PRESIDENT: We think the dairy business has a progressive influence on the man, and all his business, if by no other means than the interchange of views, and introduction of new ideas, both scientifical and practical. It undoubtedly exerts an influence vastly more important than the average man imagines. Having had some twenty years' experience in the dairy business, we feel to be in a position to judge somewhat of its progress and influence during that time. Some twenty years ago, the old cheese tub, and other rude devices for cheese manufacture, took their depaature from our mother's kitchen, and were superseded by the self-heating vat. This, of itself, was a grand achievement for the dairyman and his business. Indeed, it might be said that it was about the first step of advance in the process of manufacture of cheese, and this was chiefly valued as a labor-saving invention. Those days were not as prolific of dairymen as the present, where scientific and practical cheesemakers meet to exchange views, investigate, and discuss, without reservation, the way to make a fancy cheese. The cheese-maker of those days was, practically, a close corporation.

The foreign demand and factory system, which came into existence some fifteen or sixteen years ago, brought to notice a different set of men, men who were not afraid to investigate, and proclaim the result to the world. The result has been a wide diffusion of useful and practical knowledge pertaining to the business, establishing it on a basis and magnitude that is surprising to those best acquainted with it. We have not only succeeded in making a more uniform and better quality of goods; but have virtually emancipated the wife and mother from the laborious and exacting work of the dairy, that she used, in a great measure, to perform. Surely this was no small item in the general make up of beneficent results.

But, with all our twenty years' progress, the end is by no means reached yet. Am I not safe in saying that the threshhold is scarcely passed, in this section at least? The one hundred per cent. is not reached by John Cole, and the rest of us are still behind him. Rest assured there will be no surrender until his success has been eclipsed, and the acme of success has been reached. Do not imagine that this last step can be accomplished without an effort corresponding with its magnitude. To reach it, there must be a general charge along the whole line.

Every one connected with the business must understand that success depends upon their individual exertion. The ground must be taught to yield its sweetest grasses; the rivulet to bring down its purest waters; the cow to understand that her tenure of office depends upon her capacity of yielding up a generous equivalent for ten months of the year; the owner must know his own business and attend to it himself; the manufacturer must know the reason for what he does. In fact every one connected with the business must know that a persistent and continued effort is the price of fancy butter or cheese; but, says farmer Shiftless, this is too much work for me. We know it; we always knew it, and our advice to you is to quit the business and engage in something that requires but little work and less business, and my word for it if you do not succeed, those you leave will.

We at once perceive that this bespeaks a better cultivation of the farm, improvement of stock and a better understanding of the business.

The dairy business brings to the practical dairymen large dividends and good profits. On the other hand, stimulated by the glowing figures of seventy-five to one hundred dollars per cow, an unexperienced man imagines that all he has to do is to gather up a few cheap cows and suddenly grow rich by the enormous profits of the dairy. He generally runs the business a couple of years, making fifteen or twenty dollars per cow, sells off his cows and denounces the whole business, especially factorymen and factories. My own experience and investigation show that a very well selected dairy of our native or common cows, kept in the ordinary way, without extra feed during the latter part of the season, have yielded the last three years an average of about thirty dollars per head. While the instances are by no means rare for well selected dairies, well cared for, to net fifty to sixty dollars. This wide margin of product is mainly due to two causes: "good cows and good feed." The supplying of these two great needs would add in our section at least fifty per cent. to the profits of the business. Every farmer should be a breeder to the extent at least of supplying his own wants. By a little concentration of effort and means by those conveniently located, or through our factory organizations, the purchase of a pair or two of thorough-breds of some of the best milking breeds, adapted to our locality, would form the nucleus for improvement that in five years time would add twenty-five per cent. to the value and yearly product of our dairy, besides greatly advancing the production of good stock. The production of some good milk producing soiling crop to feed from the 1st of

August to the close of season is another of our needs which we should be glad to see claiming more prominence in our discussions and experiments. With this want well supplied it would add another twenty-five per cent. to the product.

I find, in looking over my books for the last five years, that production, under like circumstances, has varied but about eight per cent., while the price obtained for the two first years was about fifteen per cent. higher than the three last, which have not varied over five per cent. A uniformity, I venture to say, that has not been reached by any other product of the farm.

In conclusion, I would ask, has not the past history of the dairy business been replete with triumph for the advancement and the bettering of the condition of the farming community? And is not the present bright with omens of future success. In a time of general depression of almost all other kinds of business, ours has went smoothly on, increasing both in production and demand. As for the future demand for our product, I know of no better solution than the advice and admonition of the lamented H. Greeley, to the young man just entering an overcrowded profession, that "there is always plenty of room on the upper shelf."

Mr. IRA R. HALL, was next called upon to join the discussion, but said he was not prepared to speak upon that subject, as he had given it no particular thought, and it was not his hobby. He was satisfied that the influence could not be otherwise than for good, if a right principle of honor was adhered to by all engage in the business. His theme was "the skimmer," and, by permission, he desired to say a few words upon that subject. He then spoke substantially as follows:

The subject of skimming is one that should be investigated in all of its points.

It is said by some that "you might as well skim the milk, and make butter which is valuable, as to let the butter run off into the whey tank." We will admit all this. A skillful cheese-maker does not allow the cream to run off at all from whole milk or skim milk, but makes cheese of it, holds it in the curd. It is a very easy matter to run the cream into the whey tank, or just as easy to retain it.

Skimming is sure death to the dairymen, sooner or later. It is on the same principle of stealing a pin. We say that it does no harm to take off a little for coffee, and, says one, "I believe that the cheese is just as good, if not bettter. Such a factory skims, and they sell their cheese just as well as those that make whole milk, and you can't tell the difference." So it goes the rounds.

There are some cheese men that run the country, and tell their patrons that they will make twenty cents to thirty cents on every one hundred pounds of milk from the butter, but do not stop to tell their men that they cannot get near as large a quantity of cheese. And it is taken for granted that this is all clear gain; so they get the milk, but patrons never know how much milk it takes for a pound of chesse. If they would stop to consider and investigate the subject, they would look at it in a different light.

Our buyers have not made any difference between the skim and whole milk cheese until this season, I think they have made a shade difference in price. It lays in their power to have our cheese get better or poorer. If they pay the same price for poor goods as they do for good, rich, nutty cheese, we will always make the poorer kind, and recede back beyond where we started, down at the bottom of the hill.

I have been experimenting some with the skimmer the past season. In the month of May, we made what we call whole milk cheese, and it took nine and three tenths pounds of milk for one pound of cheese; but the cry was for a churn. "We must make butter from the cream that arose on the night's milk, for that wasted to a great extent." We got the churn, set it in motion, and everything went off smooth. I found that by the skimming process, one hundred and twenty pounds of milk would produce one pound of butter, worth twenty-four cents, and ten and six tenths pounds of cheese, worth ten cents per pound, or one dollar and six cents; to which add the twenty-four cents, and we have one dollar and thirty cents. One hundred and twenty pounds of milk make thirteen pounds full cream cheese, which, at ten cents per pound, brings the one dollar and thirty cents. The same results, with double the labor required to make cheese alone. If this thirteen pounds of cheese had sold for eleven cents, or one cent a pound more, the result would have been thirteen cents gain in favor of whole milk. Those are the actual results of our making butter, and in the same proportion through the season.

Mr. G. W. Carroll, of the West Union factory, Erie county, thought that the dairy business, aside from the financial results, had a moral tendency worthy of note. He was very much opposed to skimming. It was bad for one to skim, and just as bad for all to join hands, make skimming universal, and sell cheese for what it was not. That has a tendency to produce dishonesty, and is injurious in its influences.

Honorable Harry Lewis spoke of the practice in some localities, of factorymen buying milk, as destined to ruin the business. Another trouble was the "line patrons," those located centrally between two factories, and rule the position by selling to the highest bidder. This error should be corrected, and the practice stopped as soon as possible. Factorymen should hold conventions, discuss the matter, and do away with it.

The discussion was continued at considerable length, by Messrs. Farrington, Reeder, Moulton and others, all arriving at about the same conclusion of the previous speakers.

The Secretary's report was then submitted, which was quite a lengthy document, giving a history of the association from its origin to the present time; of its struggles in infancy, its growth and prosperity, the present gigantic proportions, and the benefit arising as a result of the association.

TREASURER'S REPORT.

S. B. Dick, Treasurer, read the following brief report of the finances:

Amount received from Secretary, ...		$117 50
Paid order, Hempstead & Co., ...	$24 70	
" " Colonel Reisinger, ...	27 52	
" " D. P. Robbins, ...	2 00	
" " Fuller, (postage, etc.,)	23 50	
" " Prof. Arnold, ...	40 00	
" " H. C. Greene, ...	7 50	
" " Honorable E. Reeder, ...	25 00	
" " J. W. H. Reisinger, ...	12 00	
		162 22
Balance due Treasurer, ...		$44 72

Estimate of necessary funds required to pay expenses of this meeting, and balance due the Treasurer:

Balance due Treasurer,	$44 72
Prof. Arnold,	45 00
H. Lewis,	45 00
E. Reeder,	10 00
Printing and postage,	38 00
Journal,	17 00
Republican,	1 25
	200 97
Less State appropriation,	75 00
	$125 97

Mr. **Farrington** spoke of the Board of Trade, of the benefits which it had produced to the producers of this section. He said that in its infancy there were many dairymen who thought it a scheme to favor the buyers and were afraid of it, but, happily, those days were of the past, and they were now satisfied that it had largely benefited them.

Honorable **Harris Lewis** said: "You have at Meadville the model Board of Trade in the United States, and you may justly feel proud of it."

Several of the most prominent buyers expressed the same opinion, and were profuse in their praise of the Board of Trade.

Mr. **Cole** said he had taken much interest in the Board of Trade, from the day of its conception, and to hear it thus spoken of did him more good than all his other accomplishments—Centennial, Chicago, and Meadville dairy fairs combined.

After some other minor discussion the association adjourned to meet at seven o'clock and thirty minutes in the evening.

Evening Session.

A large audience had assembled at the appointed time, and was called to order by the President.

Honorable **Harris Lewis** of Herkimer county, New York, President of New York State Dairymen's Association, was introduced, and spoke as follows:

IS THERE DANGER OF AN OVER-PRODUCTION OF BUTTER AND CHEESE?

How often this question is asked, and how often answered "yes" and "no." And it is evident that under certain conditions either answer must be correct.

To us, as dairymen, this question is of vast importance; yea, a question of life or death to the business in which we are engaged.

When we consider the vast moneyed interests at stake, and properly view the bearing of our dairy industry upon our commercial relations with other nations of the world, we are astonished at its present magnitude, and amazed when we contemplate its vastness in the not distant future.

Again: when we consider that through our own wisdom or folly this immense advantage is to be *realized* or *lost*, how important to us, as dairymen, and to every citizen of this republic as a citizen, our action becomes.

In order to show the vast and continually increasing interest of our cheese industry since the introduction of the factory system, I give an extract from the report of a member of the bureau of statistics, a former citizen of this county, to a member of this association, taken from the *Husbandman:*

Export of Cheese.

The bureau of statistics has prepared a paper showing the exports of cheese from this country in each year since 1790. The total sum is 1,262,952,571 pounds. The greatest export in one year was in 1877, being 107,364,666. This is double the export in 1867, and that was, with one slight exception, the largest up to that date. In 1862, the export was 32,361,468 pounds—double what it ever had been before, and the increase since 1862, has been marvelous. We give the figures from 1860, inclusive, at which time the exports showed a marked increase, and have every year since, with few exceptions, continued to grow:

1860,	15,515,799	1869,	39,960,367
1861,	32,361,428	1870,	57,296,327
1862,	34,052,678	1871,	63,698,867
1863,	42,045,054	1872,	66,204,025
1864,	47,751,329	1873,	80,366,540
1865,	53,089,468	1874,	90,611,077
1866,	36,411,985	1875,	101,010,853
1867,	52,352,127	1876,	97,676,264
1868,	51,097,203	1877,	107,364,666

Our total make of cheese for the past year will not fall much, if any, short of three hundred million pounds, and its money value will equal $36,000,000. The value of butter produced from 1860 to 1878 has been about ten times as great as that of cheese for the same time, but the export of butter to foreign countries has not been large nor has the export trade been on the continuous increase.

The value of butter exported during the past year has been but $4,500,000, and in 1863 and 1865 reached nearly $7,000,000, while the value of butter exported in 1869 was less than a half million dollars.

In order to impress upon your minds still further the vast interest of dairy husbandry, I will quote from a prospectus issued by the publishers of the *American Dairyman*, as follows:

"The rapid growth of the dairy interest in the United States during the past decade, has been one of the most remarkable features of the nation's commercial history. The census of 1850 showed the number of milch cows in the country to be six million three hundred and eighty-five thousand and ninety four. In 1870 they had increased to eight million nine hundred and thirty-five thousand three hundred and thirty-two, and by January 1, 1875, they were enumerated at eleven million eighty-five thousand four hundred, at an average valuation of $23 89 per head. The product of this vast investment has developed in equal proportions. In 1850 the manufacture of butter equaled three hundred and thirteen million three hundred and forty-five thousand three hundred and six pounds, which in 1874 had increased to six hundred and thirty-seven million seven hundred and ninety-six thousand four hundred and forty-nine pounds, valued at $159,449,112; while the cheese manufacture of the United States increased in the same period from fifty three million four hundred and ninety-two thousand one hundred and fifty-three pounds to two hundred and sixty-six million six hundred and ninety-eight thousand six hundred and thirty-eight pounds, the value of the last named amount being $34,670,882. In 1876 it is estimated that the combined value of the butter and cheese made in this country amounted in round numbers to $207,000,000, while the aggregate value of the milk and all its products of every kind consumed here annually was not less than $600,000,000.

These large figures are not idle speculations, but are based upon accurate statistical information, and from the most powerful, practical corrobation of the statement lately set fourth by writers upon the subject that the greatest progress ever made in any branch of agriculture has been in the stable products of the American dairy. As it is clearly obvious that in its commercial relations this interest is yet practically in its infancy, it is not easy to predict what proportions it is destined to assume within another ten or twenty years."

We shall commence our next season's operations with about twelve million milch cows, which, at an average price of forty dollars each, will represent a capital of $480,000,000, and the money value of the land necessary to their sustenance for the coming winter and summer cannot be less than $720,000,000. No wonder, then, that the question suggests itself to us, "is there dangers of an over-production of butter and cheese." Let us now turn to the dangers which threaten this, our greatest agricultural industry. They are twofold: first, competition in our own country, in Canada, and northern Europe.

We need not close our eyes to the fact that there is a vast tract of our own unoccupied land well adapted to dairying. Canada also possesses sufficient land, of fair quality, to produce every pound of butter and cheese now made in the United States. It is but a few years since the people of Canada imported dairy products from the States for their own consumption; but now they supply their own wants, and have, during the year just closed, exported nearly thirteen million pounds of butter, and about thirty million pounds of cheese; and what is more significant than these figures, is the fact that the Canadians are thoroughly awake to their interest in the dairy business, and bound to excel us, if possible, in the quality of their goods.

Australia is another competitor with us in the English cheese market, where all our cheese has been sent during the past year, except five thousand boxes sent to Hamburg and Bremen.

Let us reflect that Canada, or Australia, has the capacity to supply England with every pound of butter and every pound of cheese her people can consume, and that the people of both countries are striving to suit the English trade, with meaty, rich, full cream cheese, while our own dairymen are trying experiments to ascertain how much cream we can remove, and still pursuade the English to purchase and eat it.

A wide belt of land, stretching across northern Europe and Asia, is well adapted for dairying, and so are large portions of the South American States.

But little is to be feared from successful competition, from any source, for a long time to come, except Australia, Canada, and our cheap, fertile lands at the West. How extensive these new dairy lands at the West and Northwest may be, I cannot tell; but Wherever temperature favors, good pure water is abundant, and the Kentucky blue grass is indigenous to the soil, dairying may become a success.

By the unjust and wicked discriminations in freight rates by all our great trunk lines of railroads, these cheap fertile lands, two thousand miles distant, are placed side by side with ours, except in point of time necessary for the transportation of their freights to the seaport towns. In fact, a car load of butter or cheese from Chicago to New York city, costs less, on an average, than it does from central New York.

When we consider the vast amount of land which may be used to good advantage in dairy husbandry, we have reason to fear an over production of dairy goods.

I am aware that very many fear an over production of butter and cheese, from the fact that large and increasing quantities of oleomargarine butter and cheese are put upon the market, and take the place of so much butter and cheese. And to a certain extent, and under certain conditions, this fear is well founded.

Having briefly considered the danger of an over production of dairy products from without, some of which are remote from the intervening space, or distant from the lapse of time before successful competition can arise, let us now turn to the dangers that lurk a home. It has been said, and said truly, that the greatest and most dangerous foe that mortal man or woman could have in this world, were those of the household. At present, the greatest danger of an over production of dairy products, lies with us, and with us alone.

If we could lay aside our inordinate selfish greed for immediate gains, and employ the same energy and determination in the substantial improvement of our dairy goods that we now use to make them disgusting to the consumer, that we may seize the penny to-day, we should have no reason to fear an over production for a hundred years to come.

At present, about forty-four per cent. of all the milk produced is consumed in its natural condition, yet I do not know of but *one city in the United States* which is supplied with pure milk. The infernal greed of the milk vender rules supreme over every principle of humanity, over every rule of right, over every feeling of mercy, over the fear of the final judgment where he must stand condemned as the destroyer of his race, as the murderer of the innocent. There can be no doubt that the consumption of milk will be more than doubled when all the dwellers in our cities and villages are supplied with good pure milk, which I believe will be done before long. A tumult will yet be raised, more threatening and of longer duration, over the adulteration of milk, than that raised by Demetrius at Athens over the preaching of Paul

The greatest danger of an over-production of butter and cheese lies in the quality of the goods produced.

Until more than ninety per cent. of our butter is good, instead of being poor, as it is now, we may rest assured that oleomargarine or something worse will be used in place of the poorest grades of it. But when all our butter is good, oleomargarine will be numbered with the things of the past, and soon be forgotten forever.

How many cheese-makers will skim cheese? Yet, how few there be who like it. At the meeting of the American dairymen's convention at Cleveland, last week, one man was found who preferred skim cheese to good whole milk cheese. Yet, almost every Buckeye cheese-maker is engaged in the manufacture of skim cheese. If one man, in a State containing nearly three million people, prefers a poor cheese to a good one, we can safely make one cheese to every three million for the special accommodation of this class of consumers.

But, gentlemen of Pennsylvania, I appeal to your good sense, to your sound judgment in this matter, and ask each one of you if it is not better for you to make good, than to make poor cheese. That person, or class of persons, who, by every laudable and lawful effort, seek to furnish their customers with a fair equivalent for the money received, will soon accumulate a large and valuable capital in the form of reputation. A good and well-earned reputation is of greater actual value in our business transactions than the average money capital with which our business is transacted. This matter rests with you.

Your climate, your soil, your water sparkling from your numerous springs and brooks, your grasses, your intelligence, your pride, your ambition to excel, your future success, all points in one, and only one direction—that is, upward and onward in the march of improvement, until it may be truly said of you, that you produce as good butter and cheese as is produced in the world.

The quantity of butter and cheese to be consumed in the not distant future is only limited by the quality of the goods produced and the price at which they can be afforded.

The law of taste is the same throughout the world, and as the taste of food fades away from the organs of taste, the last impression decides our like or dislike for it. If agreeable and pleasing, we desire more; if disagreeable or repulsive, we have enough.

It is easy to make butter and cheese so poor and so filthy, that we become indifferent in regard to it. But if its use is continued, indifference begets aversion, and aversion begets loathing to such a degree that an ounce of butter and two ounces of cheese would last a man one hundred and twenty years.

I have in mind two lots of cheese purchased for the retail trade, one of which contained sixty-four cheeses, and was all retailed out in the village of Ilion within the short space of three weeks from the time the first one was cut. The other lot consisted of five cheeses, one of which lasted the villagers of Frankfort all winter, and the place of the sepulcher of the other four cheeses no man knoweth to this day.

By letters to and conversation with, a great many retail dealers in butter and cheese, I have asked the question, "What are your relative sales of good and poor butter and cheese?" These men, from practical experience (some of it bitter,) have answered all the way from one to four and from one to twenty. They all affirm that the difference in the consumption between good and poor cheese is much greater than between good and poor butter.

Finally, I answer, if our butter and cheese is so poor as to partially prevent consumption, there is great danger of an over-production. But, if we like men resolve to furnish our milk to the consumers pure, and make all our butter and cheese as good as the best, over production is utterly impossible.

If we pursue the first course, certain death to this industry will follow. But if we adopt, and rigidly follow the other, no artist can paint to us its rising glories; no mathematician can compute its coming value, or commercial greatness.

At the close of Mr. LEWIS' address, quite an interesting discussion was had upon the subject of skimming. The practice was objected to by nearly all who spoke on the subject.

Mr. FARRINGTON asked what proportion of all the cheese made was skimmed, and Mr. LEWIS replied more than half.

Mr. INGRAM in reply to a call from Mr. REAL spoke at some length on skimming throughout the United States, and said that skim cheese vary in quality as much as full cream. The discussion was animated and instructive.

Mr. REEDER, of Bucks county, was the next regular speaker. He had not prepared a speech, but spoke on

OLEOMARGARINE VS. BUTTER.

He came, he said, in the interests of the dairymen of Pennsylvania. He wished to lay before the convention, for their consideration, an act which had been drawn up some time ago to prevent the manufacturers of oleomargarine from selling their goods as butter.

Mr. **Reeder** then gave a brief description of the proccess by which oleomargarine is manufactured, and entered into a full analysis of their relative chemical compositions. He had nothing against the manufacturers of the artcicle, but only wished that it might be sold for what it is and not for butter.

The subject was then opened for discussion. Mr. **Reel** said he was sorry that the Cleveland meeting was made a medium for the advancement of the oleomargarine business, and thought that this meeting should take a decisive action on the subject. Mr. H. **Cooley Greene** showed a sample of oleo margarine, which he had procured in New York, and said it was manufactured pure and clean; that he had been using it on his own table and preferred it to a great proportion of the butter made in this county. He thought the way to suppress the manufacture was not to undertake to legislate it out of the markets. If it was, as he believed, a pure and wholesome article of food, and of such quality as to come directly into competition with all grades of butter below fine, it was entitled to a fair chance in the markets. If it can sustain the favorable impressions it is making among consumers, it is idle to fight it, and the best way to put it down is to supply our markets with a better article. Every argument and incentive has been brought to bear upon the butter-makers of America to induce them to improve the quality of their product.

If, as seems to be the case, judging from the quality of the bulk of butter received in New York city, they are disposed to still plod on in the same ruts, and will not improve. While the refined taste of our city population calls so loudly for more fine made butter, they are not to be aided and encouraged in slothfulness by such legislation as is suggested, or by any legislation. If there be anything that calls for reform in butter making, it is the fact, that to-day, and for months past, while the cellars of New York receivers are groaning with a burden of low-grade butter seeking an outlet, and finding none, there is an everyday inquiry for fine butter to supply the tables of those who know the difference between good and poor butter, and this inquiry is met only by the response, "we have no butter good enough for you." The only thing that will work this much needed reform, may, for aught we know, be this much abused oleomargarine butter. Let dairymen make a grade of butter so much above oleomargarine. that it cannot compete with it, and the new invention will die out quickly enough.

Mr. **Lewis** thought Mr. Greene had allowed the oleo men in New York to bamboozle him, and palm off upon him a package of genuine butter for oleo. The sample he held in his hand certainly resembled butter, and he believed it was butter.

Mr. **Groot**, of New York, argued that there was more oleomargarine manufactured in New York than could be made from all the beeves slaughtered in the city, and that, therefore, they must use dogs, cats, and horses to make up the deficiency.

Mr. **Reall** then moved that the association indorse the act presented by Mr. Reeder, which was carried.

The discussions were animated, but friendly, and the meeting, throughout, was one of remarkable interest. The attendance was larger than that at either Chicago or Cleveland.

A committee of three was appointed to consider the bill presented by Mr. REEDER. The bill was favorably reported, and a resolution passed, asking the legislation to enact it into a law.

Prof. ARNOLD, was then introduced, and spoke on "Pennsylvania cheese and butter as exhibited at the cheese fair held at Meadville, in October." The following is a synopsis:

Mr. PRESIDENT AND GENTLEMEN: I feel, on this occasion, somewhat like the physician who was asked to give some kind of medicine that would be a universal cure.

Every specific disease requires specific treatment and specific remedies, and however efficacious any single remedy may be in a particular case, no remedy will cure all diseases. So there are many faults in butter or cheese, and for each of these faults we must seek out a specific cure.

The manufacture of a perfect article, presupposes perfect preliminary conditions. To make good butter or cheese requires:

1st. The best of feed and care of the cows, and that the cows be in perfect health. If pastures are filled with weeds and sour, worthless grasses, you need not expect fine butter.

2d. Proper treatment of the milk and cream, as well as the butter. If the milk or cream is set where it absorbs the odors of the kitchen or a foul cellar, you need not expect the butter to be free from ill flavors. If you use a "three minute churn," or mash or grind the butter in working it, you need not expect a perfect grain.

The butter globule has been described many times, but I wish to refresh your minds at this time, and to call special attention to some of its peculiarities:

The globule in milk is the only solid part in natural milk when it comes from the cow. All other elements are liquid. The nature of these globules we ought to understand, for our success depends upon the proper treatment of them.

Enlarge a cream globule to the size of an egg, and you may separate the oils of which it is composed into three distinct ingredients—*stearine*, the hard oil; *palmatine*, the coloring oil; and *oleine*, the softer oil. If you break these globules, you smash and mix these ingredients altogether, just as if they were so many eggs; you change the color and appearance and flavor, and the egg is no longer an egg, but a broken and ruined mass, its character spoiled. So, if in churning or working butter you grind these globules to pieces, your butter will be pale in color, and greasy to the taste. On exposure to the air, this broken mass soon spoils by putrefaction, just as an egg will do, though, if kept whole, it may be preserved for a long time.

The prevailing fault with the butter I examined here last fall was the fault of having the globules all broken up. The flavor was imperfect, and it presented a greasy appearance to the tryer. In fact, this is the prevailing fault with butter made in any section. It is seldom we find a package that has not been worked more than it ought to have been.

Take a spoon and stir a pan of cream to produce butter, and you wear out the pellicle of the larger globules first, and afterwards the smaller ones; but, before the smaller ones are worn off so as to liberate their oils, the oils contained in the larger ones are broken, mixed up, and destroyed, and you get greasy butter. If you use a small dasher in a common churn you do the same thing.

Change this, and take a large dasher that nearly fills the space in the churn, and you at once agitate every particle of the cream at every movement of the dasher, and get a perfect churning, and, at the same time, greatly lessen the time required to do the churning.

Take a pan of milk in a warm room, and set it into very cold water, and soon the milk is reduced to a temperature much below that of the surrounding atmosphere, and thus the moisture and impurities of the air are condensed on the top of the cream, and the cream (and consequently the butter) is thus injured. The remedy for this evil is to have the air of the room as cool as the water in which it stands. We want to preserve the cream as nearly in the state of nature as possible. If the air is warmer than the water, the milk should be tightly covered to prevent the absorption of germs of ferment which would work its destruction.

The pellicle which incloses these globules is not caseine, as has been supposed, but is of the nature of flesh, and subject to putrefaction. I used to think I must gather my butter very thoroughly in the churn, but of late I have got over that notion. I have found that it is better not to gather it at all. Let the little pellets remain single and separate. This may be effected by cooling the mass to such a point that they will not readily adhere together while floating in the buttermilk.

The coming of the butter, as it is called, is simply the adhering of these little globules one to another, thus forming pellets, increasing in size by each addition, till they become large enough to be discerned as separate from the liquid, which is now no longer cream but buttermilk.

If the temperature be as low as fifty-six to sixty degrees, the peculiar liquid sound in the churn that indicates "the butter is coming," is first heard when the pellets are about the size of pin heads; then they are soon as large as small peas, and gradually, but more rapidly, increase in size till they are as large as kernels of corn, when they should be taken out upon a screen and rinsed clear of buttermilk by pouring clean cold water upon the mass. It is then ready to salt. Sprinkle on the salt; stir it in with a spatula or ladle, and set away in a bowl for a day, or pack immediately, with no working, only what is necessary to pack closely, and it may be well to let it get a little warm to assist in the packing, though in the summer season no pains will be required to produce this result.

A great deal of butter is also spoiled or rendered unpalatable by too much salt. You are apt to put salt in butter to preserve it, but it has no such effect. *Salt does not keep butter*, but it serves to grind up the globules or cut them with its sharp crystals, and spoil the grain. Salt should be used merely to flavor butter, and no more should be used than will make it palatable, and that is very little. Salt and oils do not affiliate, and therefore saltness does not prevent rancidity. Let the water be worked out, and when the salt is put in it will not dissolve. The butter will not dissolve it; neither will lard. If butter is made on the plan I have proposed, one ounce of salt to four pounds of butter will be sufficient, or less than half the amount commonly used. None but fine salt, that will dissolve readily, is fit to use in butter; and I need not stop here to say that none but the purest salt should be used.

Mr. DUNN asked the professor how to keep this excellent butter from May till winter? Mr. Arnold recommended oak tubs soaked in hot brine, thus rendered impervious to air; a little salt in the bottom, and a layer of salt covering a cloth on top of the butter; then bore a hole in the top of the tub, and pour in salt brine enough to fill all crevices. Butter has been kept in this way perfectly sweet for over two years.

Milk should be reduced to a temperature of 60° before being covered. After the reduction of temperature, all odor has escaped that can, and the tendency is to a condensation of impurities in the milk, if left exposed to the action of the air.

Professor Arnold said that in cheese, the same rule will apply as in butter.

Cheese is produced from milk by the use of rennet, it digests the caseine and thus produces the cheese. Bad rennets are often used, and the process of soaking them is often bad. The use of acid rennet is bad. The best way is to be sure you have good rennet, and apply it to the pure milk, and the action will be correct. Blood heat is, probably, the best standard at which to apply rennet, and the milk should be kept at that temperature. The whey should be removed from the curd at the earliest possible moment.

Many makers are anxious to produce a solid article, rather than a cheesy, digestible article. He had noticed in Pennsylvania, cheese, in a large number of cases, a clammy, sour flavor, and could not clearly account for it. It may be caused by allowing the whey to remain on the curd too long, by leaving the curd too long before it is cut, or by over heating in the early stages.

It may be avoided by cutting the curd early and cut all at once, thus get the whey out sooner. Soaking rennets in whey may produce the clammy odor; rennets should never be soaked in whey. The spinning of curd, by the hot iron test, may be produced by two causes; from a cheesing process, and from the acidity.

There is no such thing as acid aiding in converting curd into cheese, it simply stops putrefaction in cheese from milk a little tainted; but its use is unnecessary. Draw the whey at the earliest possible moment, and you will make as good a cheese from tainted milk as by the use of acid.

In the Cheddaring process, the action of the rennet continues on through the curing process, if the cheese is properly handled.

Mr. **FARRINGTON** then gave a description of the Cheddaring process, and the meeting adjourned to half past one o'clock, P. M.

Afternoon Session.

The meeting was called to order by the President, at two o'clock, P. M.

The report of the Executive Committee was first in order. Following is a report of that body:

The Executive Committee recommended as follows:

That a committee of two be appointed to secure, if possible, improved transportation facilities another season.

That the Legislature through our representative, Colonel O. O. Potter, be requested to grant us such recognition as this important interest deserves, and at least so far as the publication of our report is concerned.

That the proceedings of the Board of Trade the coming year be included in the Association report.

That a committee of three be appointed to test the "shrinkage of cheese," commencing on May 1, with cheese made April 1 to 10, and that said committee report at our next annual meeting.

We also recommend that the Executive Committee, for the future, be enlarged, by including as members thereof the first three Vice Presidents,

This report was adopted, and Messrs. L. C. Magaw and A. M. Fuller elected committee on transportation. Messrs. G. W. Carroll, G. F. Webb and J. B. Phelps were elected committee on shrinkage of cheese.

The committee on nominations reported as follows: For President, A. M. Fuller, Meadville; Recording Secretary, H. C. Greene, Meadville; Corresponding Secretary, J. M. Bigger, Cambridge; Treasurer, Colonel S. B. Dick, Meadville. These recommendations were accepted, and the gentlemen named were immediately elected by a rising vote.

It is scarcely necessary to say that this selection was simply a reëlection, and the officers are the same as last year, which fact speaks largely in their favor. Mr. **Fuller** stated that he was opposed to accepting the position another year, except it was for the best interests of the association.

The following Vice Presidents were then elected for the ensuing year:

John Cole, Venango.
M. H. Terry, Waterford.
John Fuller, Harmonsburg.
J. B. Wilber, Cambridge.
J. H. Reall, New York City.
H. C. King, Spring.
Thomas C. Cochran, Sheakleyville.
Eastburn Reeder, Bucks county.
G. W. Carroll, Union City.
William Nash, Crossingville.
Ira R. Hall, Randolph.
Dean Parker, Erie.
Honorable S. H. Findley, Atlantic.
H. Canfield, Mill Village.
A. H. Bates, Penn Line.
D. H. Nodine, Cochranton.
S. E. Kincaid, Wayne.
William Morse, New Richmond
F. Giddings, Venango.
W. W. Power, Conneautville.

A RETROSPECT.

By H. C. **Greene**, *Secretary.*

Mr. **President and Fellow Members**: I had pledged myself to myself not to inflict myself further upon my friends in the way of written harangues, at least until I might think I had something new to offer.

The programme for the present meeting, however, prepared as it is (in this respect) without my approval, affords an opportunity for breaking the pledge, not to be neglected.

I desire merely to present, as briefly as possible, a retrospective view of this association from its inception in the midst of doubts, under the bonds of ignorance, (which is only a synonym for inexperience,) and in the face of a general distrust on the part of private dairymen, down to the proud, the justifiably proud, present. The millionaire of to-day loves to forget the days of poverty, when, under the shattered roof of a drunken father, he suffered the pangs of hunger and nakedness. The proud haughty Senior disdains the hours of his Prep. life, spent agonizing over the knotty questions that daily rose before him in his upward path. They are all easy of solution to-day, and therefore he delights to ignore the fact that they were ever hard. In the pride of strength of the present, we refuse to acknowledge the weakness of yesterday. Nevertheless, there is no harm in considering the fact that the Pennsylvania State Dairymen's Association was once a baby. "Born in weakness, it has been raised in strength" to be sure, and yet is not a very old boy, though rather large of its age.

The first entry made in the Secretary's book, by the hand of D. H. Gibson, reads as follows: "Crawford County Dairymen's Association, organized at Venango borough, on the 15th of day of April, in the year 1871. At a meeting held in Venango borough, this 15th day of April, 1871, pursuant to the call of Joseph Blystone, of Venango borough, and H. C

Greene, of Woodcock borough. Meeting called to order by H. C. Greene, and organized by the choice of J. Blystone, as temporary chairman, and H. C. Greene, Secretary *pro tem.* A committee was at once appointed to draft a Constitution and by-laws.

Report of committee adopted, the preamble of which reads as follows: "*Whereas*, The dairymen of Crawford and Erie counties have thought fit to effect an organization to advance the dairy interest of this section, therefore, *Resolved*, That this organization shall be called 'The Crawford County Dairymen's Association,'" &c. The first officers of the association were, President, Joseph Blystone; Secretary, D. H. Gibson; Treasurer, J. H. Marcy; Vice Presidents, H. C. Greene, J. H. Blystone, and Thomas Van Horne.

There, gentlemen, is the birthplace of this association, and April 15, 1871, was its natal day. There and then the child was born, since grown so strong and saucy, and these are the friends who "borned" it: Joseph Blystone, Thomas Van Horne, Cornelius Van Horne, William Morse, D. C. Root, D. H. Gibson, E. Chamberlin, George Thomas, J. H. Blystone, William Nash, D. M. Crouch, G. W. Cutshall, J. T. Cook, J. H. Marcy, G. N. Kleckner, H. C. Greene, Darius Coulter, G. Wayland Brown, Adam Sherred, L. E. Townley, J. M. Bigger, Smith F. Harned. *Cash in the treasury*, eleven dollars. So you see that from a very tender age the child was permitted to carry a purse.

In those primitive days, it must be told, there was always cash in the treasury. O! for the return of the good old days before the child became prodigal.

Who says that?

The second meeting was on June 7, 1871.—And it was on that day, after three weeks incubation, now six years and a half ago, that the chicken first "peeped," (though it had not yet broken its shell,) that has become the full fledged game cock of to-day, the Pennsylvania State Board of Trade.

It is recorded that on that day were appointed H. C. Greene, D. C. Root, William Morse, and D. H. Gibson, a committee to investigate the propriety of establishing a market, and to report at next meeting.

Third meeting, August 2, 1871.—The committee found some difficulties in the way, the chief of which was the fear that if so young a child tried to walk alone he might fall and get hurt. Not strength enough yet, so the committee did not report.

Fourth meeting, September 6.—The secretary was instructed to invite Gardner B. Weeks to address the next meeting, and it is no disparagement to present company to declare we have never had a better man than G. B. Weeks to assist us. You will soon see that the boy was about to learn how to use money, for on October 4, 1871, when but six months of age, at the fifth meeting, the record runs, "An address was delivered by Gardner B. Weeks, who received a vote of thanks and forty dollars." In advertising this meeting the secretary recklessly expended *two dollars* for printing hand-bills.

The president was requested to secure, if possible, without too much cost, the publication of the address in a county paper, and my personal recollection is that he reported some laborious efforts in persuading an editor that it would be policy to publish a whole speech on so unimportant a subject as "the dairy business."

At the close of this meeting, there were fifty-five members, and four dollars in the treasury. A nest egg left yet.

The subject of a board of trade was agitated from time to time, and on

January 3, 1872, it was "voted that it is deemed expedient to organize a board of trade. Committee appointed to draft resolutions—William Morse, H. C. Greene, and D. H. Gibson."

Seventh meeting, February 7, 1872.—"The rules reported by the committee were read, re-read, and adopted singly;" and J. H. Marcy was appointed janitor at two dollars a day, and instructed to secure suitable rooms for market purposes. The charter members of this first Pennsylvania Dairy Board of Trade, were T. H. McCalmont, E. F. Stountz, Joseph Blystone, D. C. Root, R. L. Stebbins, Thomas Van Horne, H. Cooley Greene, D. H. Gibson, J. H. Marcy, William Morse, and J. H. Blystone.

Eighth meeting was held March 6, 1872, at which the janitor reported slow progress in securing a room.

Ninth meeting, April 3, 1872.—Janitor not present, and has never reported further progress on board of trade room.

The tenth meeting, appointed at arbitration room, in the court-house, was not called to order. The president being sick, secretary unable to attend, and therefore and because rolling boulders up hill had lost its novelty and ceased to be fun, but became very much like hard work, the Crawford County Dairymen's Association went into a state of—suspended animation for the space of one year eight months and eight days, during which period of time, this "child of labor and care" neither ate, drank, nor spake, nor committed any overt act whatsoever; but, thank the Lord, it was not dead. A few faithful friends met January 6, 1874, removed the pall, breathed into its nostrils the breath of a new life, and suspended animation was itself suspended; the pulse was restored, circulation renewed, and a career of acknowledged usefulness dawned.

April 18, 1874.

A gentleman from the city, rather tall, slim built, but well dressed, upon whom, it was wisely whispered, there rested not the shadow of a suspicion of his once having been a cow-boy, was introduced to the association as a city gentleman, well versed in the art of spending money. This young man of pleasing address entered into a contract with the association to take it and its officers into tuition. He would teach them how to spend their money and never lack. According to his arithmetic, one from one leaves two; and he has demonstrated this enigma till it has become an axiom, known and acknowledged of all men.

His secret lies—it lies
In one word—advertise.

Matters progressed favorably, the child passed through the measles, whooping-cough, and various juvenile distempers triumphantly.

On the 2d of June, 1875, when a little more than four years old, being so large of its age, it was thought to be entitled to a larger name. Pet names are apt to become stale.

So the ceremony of re-christening was performed—the more significant name "Pennsylvania" was adopted. Still the child grew, and developed its latent powers; and retains its identity still as the child born April 15, 1871.

Of its successful efforts to benefit dairymen, you have often heard much, and, therefore, the foregoing is made simply to fill a niche in the biographical department of dairy history.

It may not be inappropriate, however, in this connection to mention a few of the causes that have led to the prosperity and usefulness of the association.

First, it originated, and has been conducted uniformly, on the principle of "doing the greatest good to the greatest number." No attempt to manipulate the organization for selfish ends has ever been charged against any officer, and, in these times of venal corruption, this is one of the highest compliments that can be paid to any organization of men.

Self-interest has never been permitted to enter into the consideration of any scheme.

The association may not have been very fruitful of schemes, but the few it has undertaken have been prosecuted with an eye single to the general welfare. So patent has this been, that long since the mouths of would-be cavilers and grumblers have been stopped.

The first impulse to a new life was given when our worthy President consented to throw the weight of his business sagacity and the momentum of his boundless energy into the scale. Being in no way identified with any class or clan, neither a manufacturer, dealer, or inventor, his counsels have possessed a judicial character of impartiality that has enabled him to perceive faults and reprove them with a force and efficiency that no man could have exerted if identified with the manufacture or sale of dairy products. Few men would consent to devote the amount of valuable time and thought to such a work that he has done.

Then, too, it has never been the policy of this association to turn the crank to grind the ax of any individual or corporation. Exhibition of wares and inventions is solicited, and these always receive due consideration, but it has not been deemed wise to devote the valuable time of these meetings to unprofitable discussions by business competitors.

The continued success of this organization is the result of a teachable spirit on the part of members. A contentious spirit begets strife, and contentious strife is the ruin of many an organization, otherwise useful. Probably no other dairy association has held as great a number of meetings, with so few heated discussions; for to the present date the record of proceedings is not marred by a solitary instance of ungentlemanly language used in debate.

The aim has been to get information and impart it for mutual benefit, and thus mutual benefit has been secured. I desire now to emphasize the fact, that in a liberal attendance upon dairymen's conventions in various sections, none have been so free from contentions, hobby riders, and convention bores, as those of Pennsylvania.

ADDRESS BY MR. MOULTON.

MR. PRESIDENT, LADIES, AND GENTLEMEN: I may well be pardoned the hesitation I feel in addressing you, for I have recently listened to Arnold and Stewart, to Curtis and Lewis, to Horr and to Farrington, men eminent and eloquent in all that concerns the interests you represent. They spoke at Cleveland, and if my voice here but faintly echoes the important influence of their words I shall not have spoken in vain. I know and feel that while you, as producers and manufacturers, may fully realize the importance and immediate value of their advice and suggestions, that their influence should be extended through the widest possible dissemination of their ideas since the welfare of the whole country is dependent on the development of its agricultural resources. It is a significant fact that the attention of the ablest men in the country is directed with their utmost intelligence to the industry you represent, and when you consider that the man has not yet appeared in the world's history who has mastered the problems involved in producing all that the earth will yield, it is not surprising that the wisest amongst you are engaged in solving them. I know of no industry that commands for its purposes such unparalleled ability as yours, and because of this I would impress on your minds the duty which I think as business men devolves upon you.

In Cleveland, Professor Arnold told me that he intended to print five hundred copies of his report of the proceedings of the convention. Of course, I know that it is enough for Professor Arnold to attend to the professional and literary part of the work he has undertaken, but I said there and I say here that the idea of distributing only five hundred copies of the report seems to me preposterous in view of the value to the whole country of the knowledge to be imparted. It seems to me to reflect no credit upon those first interested in the questions discussed before dairy conventions that Professor Arnold, who has been identified with the work for years, should for a moment think that only five hundred copies of his work will be taken. If it were not for the enterprise of the newspaper press the work of these men would be almost lost to the world, and yet it is possible to place through this instrumentality, great as it is, only a portion of the information before the people, so that it becomes our duty to place the whole matter, in view of its vast importance, so far as we can, upon the table of every producer and manufacturer in the land by the side of the Bible, to be consulted daily, even though he finds leisure for his Testament only on Sunday. Your conventions will fail to a great extent in accomplishing speedily the benefit within the compass of your influence unless the farmer has his attention more surely drawn to the necessity and value of your deliberations, and unless you interest him sufficiently to compel his attendance at your meetings through a realizing sense of the knowledge he will gain by listening to the men whose service you have secured. It is not enough that the words be spoken, the farm must be plowed and sown with ideas, and it is essential to the full fruition of your work which involves the utmost enhancement of the value of the farm's product that the farmers should assist your deliberations with their practical suggestions and hard and bitter experiences, as that the most enterprising merchants should speak of the markets and the scientist of his investigations. Let us show the humblest toiler as well as the richest producer what he can get by coming and they will come. Five hundred copies! Why if it were proper, I would propose to Professor Arnold to give me the copyright of his report, and I would find a way profitably to distribute more than ten thousand. This work is before us necessary and easy to accomplish, if we try. Let us try. How can it be effectively done?

I understand that the distribution of the reports of the dairy conventions of the country is dependent chiefly ubon the voluntary contributions, which the simple offer of the publication of your proceedings may insure. As, for instance, in this convention yesterday morning, it was simply stated that those who wanted copies of the proceedings could have them at fifty cents each. This is well enough, as far as it goes, but you don't go far enough. Under this system the reports reach those, mainly, who have listened to the proceedings. Every dairy convention should appoint a committee, who should see that these publications of proceedings are placed in the hands of every farmer and dairyman, within the limits of its influence. The value of your product depends, first, upon the intelligence of the farmer who sends his milk to the cheese factory or creamery, and, when we reflect upon the extraordinary knowledge required for stock raising, and all that is incidental to the production of the best milk for the production of the best butter and cheese, the importance of spreading before the people the knowledge, which year after year is brought to your convention, can hardly be emphasized with words that are adequate to the subject. I said a word or two yesterday, when the subject of "the influence of the dairy business upon our farming community," was before this convention, and I used the statement made by my friend Mr. Lewis, of New York, that to provide in food for every want of the cow is essential to good butter and cheese, as the foundation of the words I uttered, and I repeat, now, my belief as expressed then, that if we can, through our influence, give the knowledge that will produce the man who will formulate the rules and laws essential to this industry, his work will be almost as beneficent, in its results on earth, as the book of Moses, when he presented the ten commandments for the government of the world. We should have a garden of Eden here, and no tired soul would sigh for the hereafter. I feel my incompetence to treat this whole subject as it deserves. I only know that I am saturate through and through with the sense of its importance to this country, and there is so much to say that I hardly know how to say anything; but I do know this, that if the interests you represent are properly represented, you will call to agricultural pursuits a vast proportion of the non-producing class, and that the ambition of the young men of the future, instead of being directed to the great cities to wear out their life and nerve, in the excitements of a worthless competition to graduate, finally, in the rehypothecation of securities and States prison crimes, will seek untilled fields, to develop for themselves, and the world, a beneficent prosperity. Last night, Mr. Lewis considered the question whether there could be an over-production of dairy products.

I shall not attempt to reconsider this question, but this discussion of it suggested to me one of the many thoughts with which this convention might be profitably interested for days. It is this: that whether there is to be over-production or not depends upon the quality of goods manufactured. If you manufacture the best quality of cheese and the best quality of butter, which you can only do by tilling the land intelligently, and breeding the stock with knowledge of their requirements, you will make a home consumption for these articles compared with which the present demand, both foreign and domestic, is as nothing; and in doing this, you will give cheap and nourishing food to the millions who need it, and enable such an education of the masses, through economy of living, as will not only help our country but the world. It is not enough to say on this subject, as Mr. Ingram said last night, that it is not for this convention to direct whether the manufacturers shall make skimmed cheese or not; that the sellers should be left to consult their own interests, and the buyers would buy whatever they choose at its fair value. No man here shall outrank me in earnest advocacy of freedom in all the avocations of life and trade; but I hold, and I think, gentlemen, you will agree with me, that it is one of the highest duties of conventions, such as this, to advise, with the utmost wisdom that can be found, such direction of industry as will lead ultimately to the greatest production and consumption of products, consistent with the blessings of health and prosperity. Every one who knows anything about the subject, knows that fine, ripe, full-cream cheese assists digestion, and that the poor stuff, now thought good enough for home consumption, hinders it and curses the fool who eats it with indigestion. Sound stomachs are a protection to the State, and indigestion leads to inactivity, ignorance, and crime; to the lunatic asylum and bankruptcy, physical, moral, and pecuniary. Let these conventions control the diet of the people, and we may safely leave to Congress the enactment of its laws.

And now gentlemen in conclusion of this part of my subject "I would that my heart could utter thoughts that arise in me." All departments of life have their heroes. The statesman of to-day is quickened in his ambition thinking of Cavour, Bismarck, and Disraeli. Counsellors, dwell with pride on the career of Webster, Calhoun, and Clay. Patriots grow eloquent speaking of Washington, Jefferson, and Lincoln, and divines challenge the interest of the world in calling the rolls of the cardinals, bishops, and clergymen, who are looking to the great hereafter, have communicated for principles the government of kings and peasants, presidents and people, directing the strongest, sympathizing with the weakest, blessing the living, and consoling the dying. We, too, in agriculture can call our roll of honor, numbering amongst its names, men distinguished preeminently for their wisdom and beneficence, and while I would not underate the influence of any class, I yet believe that in the far future, when the acts of men and their work is weighed by impartial history, those who have directed by patient investigation and practical knowledge the development of the agricultural recources of the world will take the foremost place as saviours of the people. They have developed the character of the people, not only remembering the words of Him who said "suffer little children to come unto me," but remembering also "the cattle on a thousand hills are mine saith the Lord." They have helped to make a paradise on earth for the Eden hereafter. I would that I were so gifted that I could impress upon all the people the truth that the future glory of our country is to be wrought out, not in the forum, not in the pulpit, not in the cities, but in the field. We are too near our own heroes to fully appreciate the significance of their lives, but I have listened in some of your dairy conventions to men who will never be forgotten. I would like to call their names. I challenge any department of industry to present a parallel to the knowledge and character that dignifies and educates your own. They have done more important work for less pay than any other class in this country. Their unselfishness and purity of purpose in their work should be known as memorials of them to the latest generation. Let us honor and emulate such men as Professors Arnold, Willard, Stewart, Sturtevant, Wetherill, Caldwell, and Wickson; such workers as Curtis, McGlincy, Greeve, Hoard, Gilbert, Bartlett, and Littler; such influences as Seymour, Lewis, Gooch, Smith, and your own President Fuller. In honoring them we honor ourselves. There is not room in the crown with which I would crown your industry for the jewels at my hand.

And now, Mr. Chairman and gentlemen, since your attention has been called through the public press to a resolution passed by the American Dairymen's Convention, at Cleveland, for a national dairy fair, and since a committee has been appointed to make arrangements for it, I beg your attention for a few moments to some views with regard to it. It is not necessary to make any argument to prove the necessity and importance of such an exhibition, either to this convention or the people, since the press has given so wide a circulation to the discussion which shows the magnitude of the industry it will represent. The recent fairs held at Meadville and Chicago, pronounced by experienced men to be the best ever held, cannot fail in beneficent results. But if the national fair of next autumn is held in the city of New York, as it should be, you cannot fail of a continental and world-wide influence in behalf of the dairy products of America. In the first place, there is an economical reason for holding it there, for all the goods on exhibition are in one of the best markets of the country, without further cost of transportation. A wider circulation can be given to the discussion of questions incidental to the exhibition than elsewhere, not only through the press, but through the representatives and the merchants of all nations who are to be found there. You are more likely to extend the trade in your products by an exhibition there than elsewhere. And considering only one of the important facts with regard to our commerce, I refer to the fact stated by the Honorable Harris Lewis, last evening, that Canada, before the abrogation of the reciprocity treaty, imported dairy products from the United States, and since then, with its industry quickened by foolish legislation on the part of the United State, has exported last year, thirty million pounds cheese, and thirteen million pounds butter, in addition to large home consumption. It is safe to assume that a discussion in the metropolis of the country, of the trade relations that affect your products may lead to legislation that will be of service to the whole country. I am well aware that in the past, New York, through the indifference of merchants who have grown rich out of the natural advantages of its location and whose influence unfortunately outlasted their enterprise, has been gradually losing its trade. Legislation, unwise and unjust, has been allowed to tax the commerce of the West in the East—and the merchants are naturally not grateful to us for this oppression; but at last a generation of intelligent and enterprising young men are identified with our business interests who recognize the fact that they must give value received for what they get, and they are active to-day in securing such legislation as will benefit not only the city of New York, but the whole country. It is significant that these men, represented honorably and ably by Honorable James W. Husted, Speaker of the Assembly of the State of New York, who is an ardent leader of the republican party, and by the Honorable Horatio Seymour, always right upon every theme that concerns the agricultural or business interests of the country, are rapidly moving toward not only the reduction of tolls on property transported through our State, but to a free canal system. I cannot do better than quote on the one hand the language of Governor Seymour, and on the other the words of Speaker Husted. Governor Seymour says:

"Better to abolish all tolls, and tax the people to pay the canal debt, than to lose the trade.

"Rather than to suffer its diversion into other channels, we should strike off all tolls upon western products.

"The rates of toll charged upon transportation, should be governed by the interests of this commerce, and not by the amount which may be paid directly into the treasury of the State. The increase of our wealth from the growth and value of this commerce, can be made to add far more to the income of the State, than the entire receipts from all our canals. The tolls they pay are of little importance, compared with the wealth and prosperity which the domestic and foreign commerce of our country diffuses among all classes of our citizens."

And Mr. Husted, quoting the same words, speaking in behalf of another party, showing that the partisan wall of demarkation in this question had been broken down, said:

"On that platform I place myself. To-day, the future will vindicate the wisdom of the position.

'Often do the spirits,
Of great events stride on before the events,
And in to-day already walks to-morrow.'

We must march up to, and realize as a living truth, the conception of a great public highway, that shall be as free as the river and the lake, as free as the ocean and the sea."

Now, because I know that the young men of the West, who represent its business interests, have been instructed by their predecessors to expect nothing from the over-rich and too influential merchants of New York, who have hitherfore directed its commercial affairs to the oppression of commerce, I want them brought in contact with the new influences that are at work in behalf of those measures, which the necessities of the agricultural interests of the country demand, in behalf of the producer, the consumer, and merchant, and we want them on the spot in the metropolis itself, to help solve the questions, which are of importance to them as well as to us, by the interchange of thoughts and knowledge that cover the whole question. It is, in my opinion, necessary that the most beneficent results from this national fair can only be realized by holding it in New York. I know the sentiments of many of the best merchants in your trade in New York, and I know that they are in entire sympathy with this movement, and that they will contribute to make it worthy the interest it represents. No sectional feeling or jealousy should affect us in the consideration of this question. For myself, and for those who believe with me, I can say I know no East, no West, no North, no South. I would, if I could, make the influence of this gathering of the people as beneficent as God has made the sunlight. Dawn and daylight come to us at the east first; but the sun rises to the meridian to bless all, and goes westward with its benediction of light, which is reflected back from us with thankfulness at its setting, and then comes night; but morning returns again, and, from east to west, travels daily the great glory of God, and so I would have our relations with one another, nothing but an interchange of blessings.

Chicago Cheese Fair.

By MR. J. M. BIGGER.

The National Butter, Cheese, and Egg Association and the Northwestern Dairymen's Association, united in holding, last December 18, 19, and 20, a grand national dairy fair, which proved to be the most successful affair of the kind ever held on this continent. In response to a call from the associations for a cheese fair to be held in Chicago, the dairymen from the various sections of this country, including Canada, came together with their dairy productions for exhibition, whereby the relative merits of each exhibit, and an honest comparison of them, could be brought before the notice of all interested in the dairy business. The cheese made from milk produced from the sweet grasses of the hills of New York State were placed side by side with those made from the wild prairie grasses of the West, and the limestone regions of Wisconsin and Canada competed with the old Keystone State for the awards and honors of the exhibition. There were one hundred and eighty-five entries, including cooperage, dairy salt, and dairy utensils.

The Meadville board of trade and this association decided to represent this section at the Chicago fair. Five cheeses were selected from each of five factories, making five entries, which were placed under my care, thus making my visit to Chicago one of duty as well as of pleasure and profit. Our cheese competed in the class of full cream cheese, each entry consisting of five boxes made at one time. I am glad to report that one of our entries (John Cole's) carried off the second premium, seventy-five dollars. This is another victory for Pennsylvania cheese, enhanced by the fact that there were fifty-nine entries in this class, and that the first premium of one hundred dollars went to the old Newport factory of Herkimer county, New York,—a factory that has had an enviable reputation for years, and is one of the oldest in the States. It is no disgrace to be beaten by such a competitor. The third prize in this class went to Towle & Rope, of Chicago, (probably on Western cheese.)

In the skim milk class, in which were entered cheese from which two pounds of butter had been taken for each one hundred pounds of milk, and which were made between October 15 and 20, the first prize of fifty dollars was won by T. H. St. John, of Illinois; the second premium of twenty-five dollars, by T. A. Strablow, also a western exhibitor. For skim milk cheese made under the same conditions, between the 15th and 20th of November, Newman & Thompson, of Elgin, Illinois, won the first, and Gooch & Barber, of Chicago, the second premium.

June cheese: First premium, Honorable Hiram Smith, Shebogan, Wisconsin; second, S. Littlefield, Plymouth, Wisconsin.

July cheese: First premium, G. R. Talbot, Wisconsin; second, A. V. Bishop, Milwaukee, Wisconsin.

For the best five cases of young America cheese, the first prize was won by John B. Vashing, Richmond, Illinois; second, Harmon factory, Wisconsin.

The first prize of one hundred dollars, for the best creamery butter, was taken by D. E. Wood, of Huntly, Illinois; A. J. Booth, of Salem, Wisconsin, took the second prize of seventy-five dollars, and R. S. Houston, of Pleasant Prairie, took the third prize of fifty dollars.

For the best two tubs of dairy butter made at any time, Booth Bros., of Salem, Wisconsin, took the first prize, and C. G. Buell, of Rock Falls, Illinois, the second. Two prizes—fifteen and ten dollars—were offered for the two best packages of dairy butter. D. L. Flack, of Elkhorn, 'Wisconsin, carried off the first premium, and Charles Baltz, of Chicago, the second. There were also prizes on cooperage, dairy utensils, and salt.

The cheese and butter were judged on Professor Arnold's plan, using a scale of points for judging on a basis of a total of one hundred as perfection. The judges placed the standard high on cheese, and judged all by the same standard. The highest number of points given to any one lot of cheese was ninety-seven and a half, given to the first premium June cheese. Their keeping qualities were taken into account; however, it was afterwards learned that they had been kept in a refrigerator. The next highest number of points—ninety-five—was given to the old Newport cheese, and John Cole's cheese, the third highest number, ninety points. The average number of points in the entire class of full cream cheese—fifty-nine entries—was sixty-two and a half. The average of the Pennsylvania exhibits was sixty-seven and four fifths. This is below the average of the cheese exhibited by us at the Centennial; but the Chicago judges may have adopted a much higher standard in judging.

The quality of the cheese exhibited was, with a few exceptions, quite creditable. They were, as a rule, well made, but not right in flavor. This wrong flavor was, in the opinion of the judges, caused, in many cases, by whey, either by retaining too much of it in making the cheese, by its coming in contact with the milk in various ways, such as imperfect cleansing of milk cans in which they had been carried, too liberal use of it in soaking rennets, etc., or by feeding it to the cows. Another noticeable feature was a lack of salt. Our dairymen are not careful enough in selecting the proper kind of salt for their cheese, and, as a rule, do not use enough of it. Most of the cheese on exibition were deficient in keeping qualities, the result of bad milk, improper use of whey, and light salting. This was more noticeable in the western exhibits, some of which also showed a wild flavor.

The skim milk cheese was well made, more skill being displayed in their manufacture than in the full cream cheese, and were considered a first class lot.

The butter on exhibition was very fine, especially the creamery butter, which was pronounced by some of the best judges in the country, as being of surprising excellence. The dairy butter was also good. There was a great amount of skill displayed in the manufacture. The western dairymen and factorymen seem to have studied the art of butter making more thoroughly than we. I fear we would have come out very slim, had we exhibited some of our butter at the fair. Crawford county, Pennsylvania, is in every way adapted to dairying, and has every advantage possessed by any county in the United States. And with all these advantages, it is a lamentable fact that she makes a very poor article of butter. This should receive more careful study on the part of our dairymen.

Allow me to direct your attention to the fact that the first premium on cheese went to New York State, one of the oldest dairy districts, and where the factory system has been longest in use. The next highest honor fell to Pennsylvania, and the third to a western State. The dairy business is steadily drifting to the West. They already produce a large amount of cheese and butter for the export trade. They have many natural advantages, such as cheap land, cheap labor, and cheap transportation, and in many sections a good climate. They have another advantage—they are very enterprising out West. The West is destined to rule the dairy business. The question in the future will not be, "how much cheese do the eastern States produce?" for they will not increase their production very much, but "what is the make of the West?" It will be there that the question of over production will be decided.

They have another good practice out West. As a rule they either make full cream or full skim cheese. "Skim or let it alone" is their motto. If we expect to maintain the reputation we have already secured for our cheese in the markets of the world, we must be alive to our interests. Must have a cheaper and better transportation, we must have ice cars in which to ship our cheese during the hot weather, as is now practiced by Chicago shippers. And we must be decided on the skimming question.

In conclusion, allow me to congratulate this association, and the Meadville board of trade, upon their laurels won at Chicago, and to express the hope that their efforts may in future be crowned with additional honor.

The report of the committee on dairy utensils was submitted and accepted.

The Finance Committee reported all expenses met and a small amount of money ahead.

How can the Profits of Dairy Husbandry be Increased?

By C. W. HORR, *of Wellington, Ohio.*

I have studied with some care the papers that have been read at the regular sessions of this asscoiation and other similar ones during the last twelve years.

While I have been greatly interested and profited by the hints and information that I have thus obtained, I have felt that too much time has been occupied in discussing different theories as to processes of manufacturing butter and cheese, and sometimes even in the discussion of questions that are theoretical rather than practical. Too little attention has been paid to the simple naked, inquiry, "How can the individual dairyman obtain a better profit from his business?"

It seems to be taken for granted that but little energy and skill are required for the judicious selection of a dairy of cows, or for the economical and successful management of the farm upon which they are to be kept; that a very little experience, intelligence, and information will quite sufficiently qualify a man for the management of the cows after they are selected, and for the decision of all questions as to the character and quantity of food that will insure the most profitable results.

If the dividends of a cheese factory for a single season are lower by ten per cent. than those of a contiguous one, the patrons of the former are enraged; and unless great inducement is offered them to continue their patronage another year, a rival factory is straightway organized, probably on the Granger plan, or else the milk is scattered to other factories. I do not mention this to complain, because success should always succeed, and I am not much in favor of forgiving poor work because of good excuses; but I mention this fact to increase your astonishment when I say to you that quite frequently dairies kept side by side, for a succession of years, annually show a uniform difference in yield of milk, both to the cow and to the acre, of fifty per cent., and occasionally of one hundred per cent.

Yet the wife of the man whose cows are only yielding one half as much milk as his neighbor's still lives with him and seems to retain her affection and devotion. His children do not abuse him, but remain obedient. No application is made to the court to have a guardian appointed for him, nor to have him declared "*non compos mentis.*" While the factoryman who, for a single year, falls behind his competitors even by a small per cent. is condemned without trial; his patronage unceremoniously taken from him; his business ruined, and his buildings left to be the abode of bats and owls. The farmer, for ten years, may conduct his business with so little skill, energy, and foresight as to produce fifty per cent. less milk to the acre, and to the cow, than his neighbors, without drawing upon himself the criticisms of his family or his friends, and without causing him to question his own industry, knowledge, or capacity. However ready he may be with criticisms on the management of the factory to which his milk is taken, his own self-complacency will remain undisturbed.

Now, I wish, in plain language, to call the attention of dairymen to a few points that they have not hitherto properly considered. The real difference in value between a good cow and a common or poor one is not generally understood, and certainly not fully appreciated.

A record should be kept by each dairyman, with his individual cows, so as to ascertain definitely the value of the product yielded by each. This is seldom or never done. Cows are bought hap-hazard, with too little pains, and after they are bought, they are milked till they fall from old age, without regard to whether they are worthy of retention or not. I milked last year, seven cows, and weighed the milk from each enough times to ascertain with sufficient accuracy the amount of milk yielded by each. By an examination of my account, as shown on the books of Horr, Warner & Co., I find that I shall receive for the milk furnished from these cows, during the eight factory months, a little over four hundred and forty dollars; and by figuring, I see that my various cows contributed to this result substantially as follows: best cow, ninety-two dollars; second best, eighty dollars; third best, seventy-five dollars; fourth best, sixty dollars; fifth best, fifty dollars; sixth best, forty-three dollars; seventh best, forty dollars. The two poorest ones, however, were two-year old heifers. Leaving these out, there was forty-two dollars difference between the value of the milk yielded by my best and by my poorest cow, and both of them are young. The one giving the least milk looks to be worth the most money. But what is the real difference in their value? The average man, knowing all the facts that I do, would probably say twenty-five dollars, certainly not over forty dollars. But I maintain that the cow that yielded ninety-two dollars worth of milk, is worth at least one hundred and twenty-five dollars more than the one that yielded but fifty dollars worth. These cows can doubtless be milked six years longer, and during that time, should the same difference continue—and I see no reason why it should not—I should obtain from the one cow two hundred and fifty dollars worth of milk more than from the other. And one half of this sum, it would seem, can reasonably be added to what would be the fair value of the cow, providing she was no better milker than the one with which I have compared her. If we contrast dairies, instead of cows, we will find a striking, though, perhaps, not quite so large a difference, as when the comparison is made with individual cows. I will remark, that during the past twelve years, the firm with which I have been connected, has received the milk of a large number of dairies, probably three hundred, on an average, each year. As we have charged the milk-handling by the cow, we have known the number of cows kept by each patron. I have taken great pains to ascertain the average, the minimum and the maximum yearly yield to the cow of our various daries. A trifle over six thousand two hundred pounds to the cow is the maximum, and somewhat less than two thousand seven hundred the mimimum. Ten years ago, the average was about three thousand five hundred pounds to the cow. It is now just about four thousand, possibly a little over. The average value of the milk during the last five years, has been about a cent a pound, so that our best dairies have produced over twenty dollars worth of milk to the cow more than the average, and fully thirty-five dollars more than the poorest. If you make the comparison by land, instead of by cows, you will find a still greater variation. I know of one dairyman, who, during the last year, obtained over twelve hundred pounds of milk to the acre, counting every acre of his occupied land. He bought some feed; but he produced fully ten dollars worth of milk to the acre, after paying for all feed purchased. In contrast with this, I can find, within ten miles of Wellington, fifty dairymen, whose whole farms are devoted to the dairy business, who did not produce over five dollars worth of milk to the acre during the same year. Counting the cleared land alone, I should think the average value to the acre of the annual product for the last ten years has been six dollars and fifty cents. To illustrate this point more fully, I will give from our books the proceeds of the milk of two two hundred acre farms, lying within one mile of each other. Both have been wholly occupied with the dairy business during the six years covered by my figures, and neither has any natural superiority over the other. From 1872 to 1877, inclusive, the net proceeds of their milk sent to our factory were as follows:

	Mr. W's Dairy.	*Mr.—'s Dairy.*
1872,	$2,106 58	$1,200 73
1873,	1,646 94	872 95
1874,	1,695 17	776 29
1875,	1,556 76	867 12
1876,	1,510 36	854 16
1877,	1,609 04	923 38
Total,	$10,124 85	$5,494 63

This statement shows that the one farm, during the six years, is $4,630 22 ahead of the other, or $771 70 per year, or $3 31 per acre, annually. The milk from both dairies during all this time went to the same cheese factory. Mr.——has had as many years of experience as Mr. W., and is a man of more than average ability, and is highly respected as a neighbor and citizen; but is in easy circumstances, and unlike most Americans, not very anxious to get rich, and hence he has not put the energy and the effort into his business that his neighbor has. I would add, that I could show much larger contrasts by selecting from our books extreme cases. This great difference in the yield of milk to the cow, and to the acre, is mainly attributable to the following causes:

First. Difference in milking qualities of dairies.

Second. Difference in the milking and the care of cows.

Third. Difference in water and pasture.

Fourth. Difference in feeding, not only in winter, but in the fall and spring months.

No farmer should buy a cow, that, after careful investigation, he does not believe will bring him at least fifty dollars worth of milk during the season. He had much better give away a cow, if he owns one, that does not give over forty dollars worth of milk per year, than to keep her during a series of years, even if he has to pay seventy or one hundred dollars for a five year old cow that will give seventy dollars worth of milk a year. Poor cows are dear at any price; really good ones, if young,are never sold too high. Great pains, then, should be taken in the selection of cows to obtain natural milkers.

But no matter how good cows the farmer has, unless they are carefully, quietly, and regularly milked, only indifferent results will be obtained. The utmost care should be exercised to avoid exciting the cows, either by blows or by the use of loud and angry words, or harshness of any kind. Fast driving, just before milking, should be avoided. It is much better to have the cows milked in the stanchions than in the open yard. In the barn, milking stools will less frequently be thrown at excited cows by more excited men. Although I am aware that many good dairymen will not agree with me, yet I protest against the use of dogs in driving milch cows. They certainly cause more excitement and running than would an intelligent, good-tempered man; and it is as difficult for a quick-tempered, ugly man to become a good dairyman, as it is for a rich man to enter the kingdom of heaven. I will only add, in reference to milking, that cows should be milked quickly, but very clean, and special pains should be taken to strip the last drop from their bags in the fall.

Not only should the bull be kept in a barn or a separate pasture, but as soon as a cow is observed to be in heat, she should be put by herself; of course, she should be liberally fed, so as to prevent, as far as possible, emporary shrinkage of milk.

But little need be said in reference to water and pasture, for we are all reminded about three times a day of the physical necessity of eating and drinking; and it is quite as necessary that a cow should have abundance of good food and water in order to do her work of producing milk well, as it is for a hard-working man to have wholesome food and drink. Even the best cows cannot make milk out of air and parched herbage. They have none of them the trick of converting thistles, mullin-stalks, and wheat straw into milk; nor can cows fulfill their missions fully as milk producers, if they are compelled to exhaust their physical energies in seeking their food or drink. Abundance, then, of good wholesome food and water should be furnished your cows, without compelling them to spend the whole day in traveling for them. If your pastures, by reason of drought or for any other reason, fail to supply both of these, you must furnish them at your barn.

This leads me to the fourth topic: Feeding not only in the winter but in the fall and spring months. I have not the time to give, as fully as I would like, the facts upon which I base my conclusions as to feeding, but will briefly state my conclusions and a few of the facts upon which I base them. It is very important that cows be wintered in warm barns. At least one third less feed is required to winter a dairy properly that is well stabled, than one that is not housed. Farmers will find it more profitable, I think, to feed more grain and less coarse feed in the winter than is the usual custom.

Cows should be generously messed from the time they calve until flush of feed, and for the good of the pastures as well as their own, they should not be turned out till the grass has a good start. A moderate mess should be fed as soon in July or August as the cows begin to shrink, either on account of dryness or insufficiency of pasture. As the season advances, and the value of the milk increases, both the richness and quantity of the mess should be increased. Of course, as long as the pastures are sufficiently succulent and plentiful to prevent shrinkage of milk, messing is unnecessary. But this is not generally the case after the middle or last of July, and almost never when the farmer has as many cows as it is profitable for him to keep. I recommend for July and August the feeding of bran alone, and later on a mixture of bran and middlings, or a mixture of bran and ground corn and oats. As to whether it will pay to mess cows in the fall that are poor milkers, there may be some doubt; but there is no doubt about the profitableness of liberal fall feeding with a dairy of good cows, such as every farmer should have. This is a fact that I have settled by actual experiment myself beyond all question, and also by the testimony of scores of the patrons of our various factories. To give an illustration of the character of testimony upon which I rely, in so confidently asserting this fact, I will copy from the books of Horr, Warner & Co., the milk accounts of two patrons for the past season. The first dairy, that of Messrs. Nooney & Phelon, was messed during the latter part of the season; being fed, all told, about one hundred and twenty-five dollars worth of bran. The other, Mr. ——'s had a good fair range of pasture, but were given no other feed. Both dairies had, in the latter part of the season, the same range of pasture that they had in the early part, with about the same amount of meadow in addition. In neither were milked any more cows in the late months than in the early ones:

	Nooney & Phelon.		*Mr. ——'s.*	
	Pounds.		*Pounds.*	
April,	12,638		13,312	
May,	17,564		20,599	
June,	19,807		22,369	
July,	20,244		19,310	
		Value.		*Value.*
August,	15,794	$165 83	14,539	$152 65
September,	15,572	194 65	13,099	163 73
October,	15,958	223 41	9,028	126 38
November,	13,553	216 52	4,953	79 24

Taking the June milk furnished by both as the basis of our calculation, by careful computation, you readily ascertain that by Mr. ——'s dairy not doing as well, proportionally, in the last four months as it did in June. He has lost as follows: August, $34 64; September, $56 09; October, $125 91; November, $165 28; total, $381 92.

Deducting the $125 paid by Messrs. Nooney & Phelon for feed, you have $256 92, as the amount lost by Mr. —— by not messing his cows. However, I am informed by Messrs. Nooney & Phelon that their December milk netted them enough to fully pay their feed bill, while Mr. ——'s cows were nearly dry before the end of November. The cows of the latter are, to-day, worth five dollars a head less than they would be had they been as well fed as the other dairy. Taking everything into account, then, is it not fair to say that Mr. —— loses fully $393 by not feeding? I will remark, that in figuring the problem whether it pays to mess cows or not, dairymen usually leave out several important factors, among which are the following.

1. Less pasture will be required to keep a dairy that is messed than one that is not; that is, if you keep twenty-five cows during the fall in good flesh, relying upon your pastures alone for feed, you could surely keep thirty-two equally well, by feeding, say six or eight pounds of bran to the cow per day.

By pursuing the latter course you would get a much larger yield to the cow, than if you kept a less number and gave no mess.

2. Your cows will enter the winter in much better heart and flesh, if generously messed, than if not messed at all. Indeed, dairymen have repeatedly told me in the past month, that their cows are worth ten dollars a head more than they would have been if they had relied upon their pastures alone during the fall. Besides, by keeping a few more cows on your farm, and regularly buying enough feed, together with what your farm produces, to give them a generous diet, you would be constantly enriching your land. This, in the long run, is a matter of no small importance. I maintain that you can stable cows the year round, buy all their feed, and produce milk profitably at a dollar a hundred, provided:

1. That you keep none but first class milkers.
2. That you buy your feed at times of the year when it can be purchased at best advantage.
3. That you select the kind of feed judiciously.
4. That your cows are handled and milked with the utmost attainable care and skill. I have now on my place three cows that cost me an average of $55 a head. These cows, if allowed to go farrow, milked and cared for in above manner, would surely give, in twelve months, $360 worth of milk.

These are not blooded cows. I know of a number of dairies of thirty cows each, that, managed as indicated above, would surely yield $3,000 worth of milk in a year.

The object of this paper is to stimulate dairymen to put more life, more thought, more energy, and more enterprise into their business. Competion compels factorymen to do their very best in handling the milk after it is delivered to them. Darwin's law of the survival of the fittest certainly holds good with cheese-makers and factories, whether it does in the animal kingdom or not. It would be better for the dairy interests if the same law applied with equal force to farmers. No man has a moral right to waste either God's blessing or his own opportunities. It is a moral crime to produce only $5 worth of milk to a cleared acre of land, when it is quite possible to produce $10 worth. It is an outrage against intelligence to milk a cow year after year that gives only $30 worth of milk per year, when *some* can be found that will give three times that, *more* that will give twice, and very many that will give $50 worth. God intended a cow that gives only three thousand pounds of milk in a season for the butcher's shambles, and not for the milking-yard; and He intended the farmer who will continue too keep such a cow, year after year, for a milker of goats in some benighted land, and not for a milker of cows in this enlightened country and age.

Dairymen of Ohio and of the United States, you have great reason to be thankful for your prosperity during the past three years of financial storms and disasters. Cheese and butter, during all this time, have found ready sale, at remunerative prices. The oft-feared danger of over production still remains an unfulfilled prophecy. You have been especially favored by fortune, and have been able to clear your farms from debts, and beautify them with improvements, while many of your fellow countrymen, engaged in other avocations, have, by depreciation of values and prostration of business, been reduced to poverty and bankruptcy. If you would retain this prosperity, you must deserve it. Those of you who have lacked in thoroughness must wake up from your Rip Van Winkle sleep, dig out the stumps, and cut down the straggling trees that mar your pastures and greatly lessen their growth of grass; ditch or underdrain all your low and swale ground; plow deeper, cultivate more thoroughly, and seed down with more care; break up your hide-bound meadows; kill the weeds, thistles, and briars, and grub out the shrubs and clear up the underbrush that deface the beauty and destroy the productiveness of your fields; save, utilize, and conserve better, both the solid and liquid manure of your barns and barn-yards; buy cows, and only those that are first class milkers; sell your inferior ones to the butchers, and, if you can't sell them, give them away to your brother-in-law; winter your herds in warm barns, with generous feed; have your cows kindly, quickly, carefully milked, and by the same hands during the entire season; feed them so well in the fall that your November milk will bring you more money than your June or September. Do all this, and, if there should be a decline of twenty per cent. in the value of butter and cheese, your prosperity will continue. There are great possibilities yet undeveloped in your business; achieve them. There is too often a mean rivalry between cheese factories; let there be a generous one among the dairymen. At the end of each season, compare results with your townsmen, and let the golden medal be given to him who has produced the most milk to the acre, with the least expense for feed; and the silver medal be given to him who has produced the highest average to the cow.

Permit me, in conclusion, to suggest, for the benefit of any one who may think it impossible to accomplish all that has been recommended, the following sentiment uttered by Gœthe: "Energy will do anything that can be done in this world, and no intellect, no circumstances, no opportunities will make a two-legged animal a man without it.

SPRING MEETING AT WATERFORD.

April 10.

The association was called to order at two, P. M., by President Fuller, who announced the following committees:

Finance Committee, E. H. Thurber, H. Post.

Committee on Dairy Utensils, S. A. Farrington, H. C. Greene.

Mr. FULLER also announced that the premium list for the National Dairy Fair, to be held next fall in New York City, will be distributed to every factory in this section in due season.

A resolution was passed instructing the President to appoint a committee to act in conjunction with one that may be appointed by the Board of Trade at its first meeting on the 7th day of May.

Address of President A. M. Fuller.

GENTLEMEN: I always consider that in addressing this association, we are not merely addressing the few representative dairymen who are regular attendants upon our meetings, but rather through you, by means of the press, the entire farming community of this section. Nor does the influence of our meetings end here, but frequently extends to the instruction and benefit of other dairy sections throughout the country. In this connection it is interesting to note, that the proceedings of our annual meeting, held in January last, were fully reported by the press of this section, and extensively copied by the agricultural papers of the country.

The New York *Daily Times* honored us with a brief but favorable mention, and the Utica *Republican* copied quite largely from the addresses of Mr. Cole, Mr. Hall, Mr. John Fuller, and others. I desire to impress upon you the fact, that we are not only pursuing a course calculated to advance our own interests, but that we are serving others as well, and I think you should feel, in addressing this association, that you are performing a service for the good of many.

CHEESE INTEREST.

We are met to-day, as it were, to set the ball in motion for another season. I trust the returns of the coming season will be as profitable and satisfactory to the interest, as the business of the past year, and that the dairy business may escape the utter prostration which seems to characterize almost every other branch of business at the present time.

It is to be supposed that factorymen have fully matured their plans for the coming season, with their patronage secured, milk routes established, and everything in order for the season's work.

I hesitate somewhat in discussing the prospects of the business. Everything must indicate a largely increased production of both butter and cheese, and more especially of the latter. What effect this may have upon the market it is difficult to predict. It will certainly demand the exercise of great care upon the part of the patrons in the discharge of their important duties, the best skill of the manufacturer in his particular department, and due discretion upon the part of salesmen in handling the product in order to secure the best results attainable.

I consider that the interest at the present time demands the greatest care and the exercise of the best judgment that it possesses.

AMERICAN DAIRY FAIR.

I desire more especially to call your attention to the National Dairy Fair, to be held in New York City during the fall months, and to suggest that you now take such action in reference to it, that the butter and cheese product of Pennsylvania may be creditably represented. I consider it to be of greater importance than any exhibition of dairy products that has yet been held in this country, not excepting the centennial exhibit.

Dairy fairs, as promotive of the best good of the business, are held in high esteem in most of the dairy districts of Europe.

From the fact of its being held in the most prominent shipping market of the country, it will be the more conducive to the best interests of the producer and assure the introduction of his product not only to the resident dealers but to foreign shippers.

The large export trade which this country has already established in dairy products and the probability of a largely increased production of both butter and cheese should lead us to encourage every enterprise whereby the interest may be benefited.

I would suggest that you appoint a committee to take this matter in charge, or that you request the Board of Trade to make suitable arrangements for a representation upon the part of the cheese interest of this section. As a member of the committee appointed by the American Dairymen's Association to make the necessary arrangements for the fair, I shall do all in my power to render it a success.

BUTTER INTEREST.

At our meeting in January last, the subject of butter *versus* oleomargarine was fully discussed; since then the necessity of our devoting some attention to this particular branch of dairying has frequently occurred to me.

I shall enter into no discussion of the merits or demerits of oleomargarine. I would simply say, that no matter whether it stands as a successful competitor of butter in the butter market or not, an improvement in in the quality of the butter product of northwestern Pennsylvania is demanded.

The members of this association and the regular attendants upon its meetings are persons interested principally in the manufacture of cheese; but I believe a product so closely identified with cheese as that of butter should claim, at least, a passing notice and a respectful consideration at our hands.

The manufacture of butter, I feel confident, will, in a few years, be accomplished upon the factory plan. As many may not understand the difference between this and our present creamery plan of making butter, I will explain: In the factory plan of butter making, the butter is made from sour cream, and the milk utilized in the piggery. Our present method consists in making sweet cream butter, and using the milk in the manufacture of skim cheese.

The former plan produces butter, in every respect, similiar to dairy butter, and possessing fully its keeping qualities. The butter made upon the latter plan is suited only for immediate use. The Elgin, Illinois, creamery have obtained, recently, forty cents per pound for their entire make, and other creameries have, probably, done as well, while dairy packed butter has sold in the market at twenty-five to twenty-eight cents per pound. It does not seem probable that the factory plan of making butter, if introduced into this section, would be practicable to many of our farmers, hence we must make the best of it, and, though we cannot expect to exert the same beneficial results over butter that have been accomplished in the manufacture of cheese, yet I consider that we should make an effort at reform.

It would be safe to assert, that one half of the butter made in this section is of a very inferior quality, and at least one fourth of it is more worthy of being called grease than butter. Why should this be the case, when we possess every facility for the manufacture of as good an article as is produced in Bucks or Bradford counties? It is simply this, we lack the requisite "skill."

The annual loss to Crawford county arising from this cause, will not fall short of $50,000, and you may add $5,000 more to the account of the dealer, and I presume that Erie county is in much the same position. Every dealer who buys it, rates it as the most unprofitable branch of his business, and every man who uses it, in five cases out of ten, curses it. I have had a taste of it myself for the past two months. Your worthy president of the Board of Trade, assured me that it was the best to be had. If there was not a fair prospect of obtaining a better article very soon, I should certainly be tempted to send, in company with our friend Mr. Greene, for a package of oleomargarine.

When we consider the fact that dairying is, and must be, for years to come, the leading agricultural industry of this section and also that competition every year is growing stronger, the quality of dairy goods more closely scrutinized, and the trade constantly demanding better goods to the exclusion of low grades, it behooves us to make an improvement in our butter product, if we would keep pace with the times. There is as great a demand for improvement and an opportunity to gain a reputation in butter making as in cheese making.

Chautauqua county, New York, by great effort has secured a reputation for the manufacture of fine butter that she may well be proud of, and we, in this section, should be satisfied with nothing less.

The question is, "how can it be effected?" I believe it can only be done by affording our butter makers some instruction whereby they can acquire the skill requisite to the production of a better article.

The best authority upon butter making is said to be the recent work by Professor Arnold, a volume of three hundred and fifty pages, entitled "American Dairying, a Manual for Butter and Cheese Makers." The work treats upon the following topics, which should prove instructive to every farmer and dairyman whether he possesses one cow or twenty: "Dairy Farming," "The Selection and Breeding of Dairy Stock," "The Care and Feed of Dairy Stock," "Butter Making and Cheese Making," "Butter factories, Creameries, and Cheese Factories."

I have obtained a number of copies for those who may wish the book, and will dispose of these and as many more as may be called for, at their actual cost, ninety-eight cents. Parties ordering by mail will add twelve cents for postage. I desire also to present to the association three copies of the work, on condition that they be presented by the association to three practical butter makers, who will undertake to test Professor Arnold's plan of butter making during the coming season, and report the result at our next meeting. I would also suggest that, in connection with the report, each exhibit a package of butter made during the month of October, after the plan set forth in the book. A thorough knowledge of butter making is far more important to the dairy interest of this section than it is commonly thought to be.

The question is frequently asked, "Is there not danger of an over production of butter and cheese?" It is said that there is no immediate danger, from the fact that it is not possible to increase the amount of dairy stock in a greater ratio than the increase of population, and I believe the census in 1880, will prove this; but there is likely to be at any time an over production of butter or cheese, resulting, however, in a diminished production of the other.

For the past few years the manufacture of cheese has been more profitable than that of butter, but should it become necessary to increase the amount of butter made, because of the over production of cheese, I fear that this section would not be prepared to undertake it profitably. If we endeavor to accomplish it upon the creamery plan, we shall sustain a loss in reputation, and eventually in profit, and in the production of an inferior article of cheese. If we attempt to meet it on the butter factory plan, many of our smaller farmers will consider it more profitable to make butter at the dairy; hence, I would invite your attention to this important subject, and urge upon you the necessity of devoting some thought to the needs and requirements of the butter interest in this section, and thereby add to the value and profit of this branch of the dairy business.

The seeming importance of these subjects must answer as my apology for occupying any portion of your time during this brief session. I trust they will be considered worthy of your attention.

President FULLER spoke as follows in regard to the several topics introduced in the opening address:

First. In relation to the cheese interest. That he did not consider that there would be a greatly increased production of cheese in the older dairy districts, but that it was reported that in Iowa, one hundred new factories would be built this season, and that the production of cheese in the western States would be largely increased, and that if the demand was no greater than it had been during the past year, we might expect lessened prices for the coming season. The only safe plan to pursue would be to make the better class of goods, and move the product as rapidly as it is ready for market, accepting the market price. This course would no doubt be adopted by the older dairy sections.

In regard to the National Dairy Fair, the reputation for the production of a fine article of cheese which Pennsylvania to-day possesses, is due largely to our participation and success at the dairy fairs which have been held in this country during the past few years. Hence, we must not fail to be represented creditably at the fair to be held in New York City this fall. Circulars and premium lists will be furnished every factory in this section.

The butter interest he hoped would no longer suffer neglect at our hands. The butter makers of this section are fully awakened to the necessity of adopting the more approved methods in the manufacture of butter, which will result in the production of a better article. Let us render them all the assistance possible.

The President closed his remarks by quoting from the Utica *Herald*, as follows in regard to the price of cheese for the coming season: "Never since the establishment of the Little Falls and Utica Boards of Trade, have they opened on such a low market. This is mainly due to the large productions last season, of which it is stated by good authorities, there is considerable yet to come forward.

All this will have its effect upon the market the coming season; but there is another cause which will also have considerable influence upon the future market. So many new factories have been or are going to be opened, that the cheese product must be largely increased, if the season's flow of milk is maintained. And the only way in which a corresponding increase of exportation can be hoped for, is in keeping the prices down. In fact, it looks very much as if the price of cheese this year was destined to rule much lower than the factorymen will be pleased with.

There is only one remedy that we can suggest, and that is to put all the cream into your cheese, and make a better article than ever before.

With such largely increased production, it would seem as if there must, hereafter, be more discrimination made in the purchase of cheese.

Mr. **TERRY** hoped the remarks of the President, on the subject of butter, would elicit discussion by those present, many of whom are engaged in butter making.

Mr. S. A. **FARRINGTON** added his earnest indorsement of the position the President has taken on many important points.

This section stands in good repute as a cheese section, mainly because of the exhibit at the centennial, and this shows to us the importance of making a respectable display at the National Dairy Fair. We can do nothing else that will help us so much in securing a desirable reputation for our goods. The great West is now putting upon the market immense quantities of cheese, though it is but yesterday that she became identified as a cheese producer. If we would hold our ground, we must avail ourselves of every means to keep the hold we have on the market. I want to see such action taken here, as shall indicate a disposition to support the efforts of this association in their behalf.

Mr. H. C. **GREENE**, by request, very briefly described the process of making oleomargarine butter, and called upon Mr. Magaw to state his experience, as a dealer, in selling the article.

After Mr. Magaw's remarks, Mr. **GREENE** said: I am grateful to Mr. Magaw for being so kind as to come to my defense in this matter.

When I made the statements I did in January respecting oleomargarine, I thought I was taking tenable ground, not as an advocate of the article, but in opposition to the unfair efforts that were being made to prevent its introduction.

The statements of Mr. Magaw fully verify my prediction, that as soon as people find that there is an article to be had that is sweet, clean, and better than poor butter, they will not be slow in buying and using it, if left to the decision of their unbiased taste and judgment. I want to see oleomargarine driven out of the markets, and its manufacture stopped; but you cannot do this by legislation. There is one way, and only one, by which it can be done, and that is by converting every poor butter-maker into a maker of good butter, so that there shall be an end of this flood of poor stuff that so curses us, and the consumers find no trouble in supplying their tables with fine butter. When there is no demand for oleomargarine it will die out—not till then.

L. C. **MAGAW**. I hope never again to have to take a sample like this before a gathering of this kind. I was driven by sheer force to take hold of the sale of this article to meet the wants of my trade. I had nothing and could get nothing to fill the place of good butter till I found this oleomargarine. This seemed to please my trade, and does yet. I have sold, by sample, sixteen packages a day to my customers in the trade, and no word of fault comes back to me. There is a prejudice against its use; but prejudice gives way before the fact that the article seems to be clean, and it is sweet and palatable. The western fine butter makers sell their products, now, at forty cents per pound. Oleomargarine, at seventeen to twenty cents, gives the dealer a good profit, and satisfaction to consumers; but I do not believe it can ever take the place of strictly fine butter.

S. A. FARRINGTON. Our Secretary has been roundly berated for the position he took at our last meeting. Dairymen thought he was disposed to work against their interest, which, I am sure, he was not, and is not. I believe oleomargarine to be a godsend to butter-makers, to compel them to produce a finer article or stop making butter entirely.

Mr. FULLER took upon himself the responsibility of introducing the article, believing it would be a matter of interest to the butter-makers of Erie county to see just what they had to contend with.

Mr. LONG. I have now in my store some butter, and have had for some time, but it fails, utterly fails to meet the wants of my customers, and will not sell. Oleomargarine comes in to fill this want, and it seems to fill it well. But it will not, it never can compete with fine, rosy, gilt edged butter.

Mr. A. M. FULLER then called for volunteers who will accept his offer of the volume on American Dairying, by Professor Arnold, and experiment and report on Professor Arnold's theories of butter making.

The following gentlemen volunteered to do so: M. Campbell and G. Mitchell, of Waterford; E. R. Humeston, Guy's Mills; S. N. Chase, Meadville.

DAIRY STATISTICS.

By N. B. HOFFORD.

The Executive Committee of this association assumed the liberty of placing my name on the programme, and assigned me a subject, without consulting me. I did not decline the honor thrust upon me, and appear here to make that committee regret their action. I will, therefore, monopolize some of the precious time of this meeting with some dry statistics. A statistical article or address is among the driest of dry topics, and I am not egotistical enough to imagine it within my power to make them otherwise. I will not begin at the creation, but will commence at the beginning of the factory plan of dairying, which, happily for you and for me, will be only a condensed history of the last eighteen years.

There were six million men and women in the United States engaged in agricultural pursuits according to the census of 1870, and of this grand army only a corporal's guard of thirty-five hundred and fifty were engaged in dairying. I don't know as there is anything in these figures from which to point a moral, but something might be extracted with which to adorn a tale. For example, there were about as many people engaged in producing turpentine as cheese, and still I can safely assert that cheese is better as a diet than turpentine. Twenty-four thousand barbers and only thirty-five hundred dairymen. Sewing machine agents outnumber the dairymen by a large majority. There were nearly ten thousand teachers of music, and a third of that number that beat time to the music of the cow bell. There were five thousand two hundred and forty-three hotel clerks, who would not look at a dairymen if they could help it. At that time there were two dentists for every dairyman, and a journalist and a half apiece to learn the dairymen how to "cheese it." Worst of all there were forty thousand lawyers, or thirty lawyers for every cheese factory. But when I found there were ninety-two thousand milliners I abandoned that line of information.

The progress of dairying in America since the adoption of the factory system has, indeed, been remarkable. Eighteen years ago America claimed but two cheese fantories, and ten years later the number had increased to over thirteen hundred. The past seven years has shown even greater progress in this branch of industry, and the number of factories that will be in operation in the United States for the year 1878, will, no doubt, exceed six thousand. From this we find that from the two cheese factories in operation eighteen years ago, the number has multiplied until factory cheese has become not only one of the leading articles of export, but up to this time has been one of the most profitable agricultural industries. In the more favored sections, adapted to dairy purposes, it will doubtless continue to be a profitable branch of trade for many years.

Although the rapid growth and uniform profit in these years is gratifying, even more so is the improvement in the quality of the product.

Seven years ago, Pennsylvania had twenty-one cheese factories, distributed as follows: Crawford, eight; Tioga, seven; Erie, three; Philadelphia, two, and Chester, one; but cheese was made on the farm dairy plan in quite a number of counties not named.

Much has been said about the wonderful progress of the western dairy sections in the past year or two; but we find in the census tables, that the West, as well as the East, led our State, even at that time. Of the thirteen hundred then in operation, New York had eight hundred and eighteen, Ohio, one hundred and ninety-five; Illinois, sixty-nine; Wisconsin, fifty-four; Michigan, forty; Vermont, twenty-eight, and Massachusetts, twenty-six. In that year Pennsylvania was second in butter and eighth in cheese. Pennsylvania then produced a little over a million pounds of cheese, and gave employment to ninety-three persons all told. Our State is credited with one sixtieth of the gross amount of cheese produced that year.

The Pennsylvania cheese interest, however, is confined, principally to the northwest corner of the State, embraced in the five northwest counties. A brief table will show its extent in 1870:

	Improved acres.	No. cows.	pounds butter.	pounds cheese.
Crawford, ...	328,000	24,247	2,046,262	196,039
Erie, ...	280,000	20,140	1,896,701	165,739
Mercer, ...	260,000	15,507	1,516,067	101,530
Venango, ...	122,000	6,963	566,405	5,026
Warren, ...	83,000	7,422	759,853	11,042

This shows, that with seventy-five thousand cows, or one tenth of the cow population, this section made one half the cheese and over one ninth of the butter produced in the State. We didn't do very well, but we beat the balance of the State.

There can be no doubt of the adaptability of this section to this special industry. In this latitude the grasses are sweeter than further south, while to the north of us the season is too short to admit of profitable dairying. By a glance at the map it will be seen that the dairy region lies between the forty-first and forty-fourth parallels, north latitude, and all the important dairy sections east and west are within this belt.

Having ascertained that we are on the belt and enjoy all the advantages of rich pastures, good water, and the best of markets, the question will naturally arise: What remains to be attained? There is still much;—and in saying this I trust the assertion will not be construed as a discouraging remark. This can be applied in a general way, for only by perseverance and constant progress will our dairy section be enabled to keep abreast of the progressive spirit of the age. But I intend to apply the assertion locally.

The chief fact to lament is the low grade of milch cows with which our dairymen seem to be content. A gentleman, prominent in dairy matters, remarked that there was a noticeable depreciation in the stock of this section in the past few years. If a fact, it is a lamentable one, that in this particular we should go the wrong way while making such commendable progress in the quality of the product, and in many other particulars. The amount of dairy products of this section can be doubled by an improvement in stock, without any increase in numbers. If the product be so doubled the last half is all profit. Herein lies the key to the profits for the next few years. A very large half of the cows of this State eat themselves up every winter, and some cows eat the profit end off their more prolific sisters. Better cows must be had and we think the wide-awake dairymen who have fought so bravely the evils of skimming and other heresies, will not fail to remedy this defect at the very earliest moment. It was my intention to make mention here of many far-sighted farmers who are engaged in the laudable work of securing the best dairy stock for this section, but the time is too brief. To such men this association should extend the heartiest support. They well deserve and need all the aid that progressive dairymen can give them.

I made an effort to secure complete reports from all the factories in Pennsylvania for the past season. In this I was unsuccessful, for what reasons factorymen, probably, best know. Of the entire number on the list—over one hundred—thirty-two made very complete reports, and many others partial reports. The consolidated reports of these thirty-two make the following showing:

Whole number of boxes, forty-three thousand five hundred and sixty-seven; aggregate number pounds cheese, two million four hundred and seventy thousand one hundred and ninety eight; average price per pound, ten and a half cents; number pounds of butter made, sixty-one thousand; average price per pound, twenty-five cents; aggregate value of product, two hundred and seventy-four thousand six hundred and twenty.

Taking this as a basis, we can estimate quite closely the value of the product in this district. I have tried to make these statistics accurate, where possible; but when estimates are made they are put at the under figure, and estimating the remaining factories to show nearly as well as the thirty-two reported, would give a product valued at about seven hundred and twenty-five thousand dollars. This is lower than some guess it; but I am convinced is not many thousands below nor above the actual receipts.

* * * * * * * * * * * *

Of the whole number of boxes of cheese made by these factories, two thousand two hundred and seventy boxes, or less than six per cent., were sold to the home trade.

Here is a place for a lesson to come in, I imagine. Located, as this district is, so close to the great oil and iron sections on the east and south, a good market should be found there for a large percentage of this product. But Pennsylvania cheese is almost unknown there, and in as important a market as Pittsburgh, it is almost an impossibility to find a palatable cheese at any time. The market is almost exclusively supplied with Ohio skims, and the great masses eat it sparingly, and say they are not fond of cheese. If that same quality was sent to Europe a few months, there would be no market abroad. All honor, then, to the intelligent dairymen who have advocated improved qualities, and have made such substantial progress. They have made the markets we now have, and, if all dairymen work to the same purpose, the world's markets will open wide for all the full creams America can produce, at profitable prices. I have no suggestion to offer as to how the home trade shall be increased or the grade of milch cows be improved; but the subjects are worthy of the best thought of this association, and of the Board of Trade; and, if they attempt improvement, I know they will succeed in such an effort, as they have in all important movements looking to the welfare and prosperity of our great local industry.

Mr. TERRY. The fact is that we have at home a good market for fine goods, but we will not put our best goods upon the home markets, but when we have something that has been skimmed blue, it will do for home consumption. The fact is worthy of your serious attention, and we hope you will all feel called upon to speak upon this and other topics touched upon at this meeting, in which you must feel a vital interest.

JOHN COLE. We do sometimes make late in the fall a few cheese that are double skimmed—or blue skimmed, if you please. The buyers don't want them, but our patrons prefer them because they do not cost so much. Let us refuse to make any of this kind of cheese and relieve the stomachs of their families of the labor of trying to digest an article that is indigestible and unfit for human food.

Mr. FARRINGTON. I have always contended that the reason why so much of the skim cheese made sells for a price little or no less than that of whole milk cheese, is that there is more skill or energy brought to bear in its manufacture. We must use more skill in the manufacture of dairy products, or skim cheese and oleomargarine butter will steal a march on us. We must encourage home consumption. England consumes ten pounds of cheese per capita, while America consumes but four and a half. Now, it costs the Englishman more to eat cheese than it does the American, but he regards it as an excellent article of diet, while we only eat it as a luxury. Were we to learn the actual value of cheese as an article of food, and use it as such, what a vast difference it would make with our markets.

Dealers are more responsible for skimming, perhaps, than any other class, but we are driven to pay these prices because we can turn them for local winter consumption at a better profit than the whole milk cheese.

EVENING SESSION.

Half past seven o'clock, P. M.—Report of the Finance Committee, who collected $7 50 for memberships and the reports for 1877.

Report of Committee on Dairy Utensils.

We have to report that we have examined the Keystone butter worker, invented and manufactured by P. G. Woodard, of Waterford, Erie county. The principle upon which it is constructed is that of a corrugated roller operated by cogs from right to left or left to right upon an incline plane. As an implement for the use of merchants in mixing colors and qualities, making a uniform mass, we think it will prove very useful.

The corrugated roller we do not regard as the best instrument for working butter in dairies.

The Montgomery churn dasher thermometer for readily indicating the temperature of the cream while churning was exhibited by the inventor and patentee, Mr. Montgomery, of Sheakleyville, Mercer county.

We are favorably impressed with this little device, and think it worthy of attention, especially of all who use the dash churn.

The boss milk pan, manufactured and sold by Barton & Culbertson, of Waterford, Erie county, is based on the principle of cooling the milk at the sides. We think this to be a very convenient pan, and approve the principle of its construction as compared with the old method. We recommend these pans as a valuable substitute for the small pan or crock, or any system of cooling by the atmosphere.

Respectfully submitted,

S. A. Farrington,
H. C. Greene.

Announcement was made by the President for the opening meeting of the Pennsylvania Dairy Board of Trade, to be held at Meadville, on Tuesday May 7, at two o'clock, P. M. Subject for discussion: "Condition of the cheese trade, and the course to be adopted in the sale of cheese the coming season."

The following committee was appointed on American Dairy Fair, to act with a committee of three to be appointed by the Board of Trade: M. H. Terry, Waterford, Erie county; G. W. Carroll, Union city, Erie county; John Cole, Venango, Crawford county.

The President introduced the matter of procuring Professor L. B. Arnold to visit this district, and spend the month of June among the cheese factories, giving instructions or hints to cheese makers, and addressing meetings of patrons at their factories, so as to impart needed instruction at the fountain head of the business. The following letter from Professor Arnold was read, expressing his willingness to visit Pennsylvania factories for the purpose proposed:

Rochester, N. Y., *April 1, 1878.*

Mr. A. M. Fuller:

Dear Sir: Yours of the 29th of March, making suggestions in regard to meeting patrons, etc., in June or July next, is received and contents considered. I have no doubt, if you could get the patrons together at the busy time you propose, much good would result from a conference. I hardly know how to spare so much time as you ask. My pen is very busy, and engagements a good while in advance have been made, and others keep coming in. The mail which brought in your letter, brought another from Cirinster, England, asking for an amount of labor that would, probably, require three months. But I should feel so much interested in meeting your dairymen, that I believe I should venture to go for four weeks at a very moderate compensation—say one hundred dollars and expenses. It would be a rest, or, at any rate, a change, and I should hope to be benefited by the journey. The reference to improving cheese for home and foreign use, related to the modes of manipulation; to develop more cheesy flavor with less acid, and longer keeping, and more richness; but *this mode is* not *altogether* new.

Respectfully,

L. B. ARNOLD.

MR. FARRINGTON. If a man of Professor Arnold's knowledge and tact were to visit us and never open his mouth to the cheese-makers, but simply make observations to the patrons at their home meetings, it must result in immense benefit to the interest.

JOHN COLE. I have tried to induce my patrons to get together at our factory or at our church, and discuss matters relating to their interest, but after a few evenings the meetings began to lag, and it was not a success.

True, dealers and factorymen are carrying the association, to a great extent, but they do it because they have to do so, or it would cease to run. I am in favor of any means that will induce patrons to exhibit a greater interest in their own welfare.

MR. FARRINGTON moved the adoption of the following resolutions, which was readily done:

Resolved, 1, That the President of the association be requested to accept the proposition of Professor Arnold, and receive the names of factories, provided that fifteen, and not to exceed twenty factories join in the call to Professor Arnold to spend one month, during the coming season, in this section, visiting factories and holding patrons' meetings.

2. That L. C. Magaw, Esquire, be appointed treasurer, and that each factory, desiring Professor Arnold's services, deposit with the treasurer the sum of ten dollars.

3. That on the opening of the Board of Trade, May 7, the factories interested, appoint a committee to take charge of the mattter, and arrange a programme for the factory visits and the patrons' meetings.

4. That Professor Arnold spend at least one day at each factory, and hold a patrons' meeting every other evening during the term of his engagement.

5. That any funds that may remain in the hands of the treasurer, after paying Professor Arnold $100 and expenses, and payment of expense incurred by the committee in advertising, &c., shall be returned to the factories participating in the arrangement.

6. That the President of the association be requested to issue a circular to the factories of this section setting forth these resolutions.

BUTTER MAKING.

By J. M. Bigger.

Butter is a dairy product that represents an immense money value, and of which we are all either producers or consumers. Statistics show that the United States produced last year over nine hundred million pounds of butter—about three pounds of butter to one pound of cheese—valued at $175,000,000, or about five times the value of the cheese produced. This butter did not average over nineteen cents per pound. Had it been properly made, and handled, and up to the standard of what is termed in the markets "good to fancy," I think I am safe in estimating it would have brought an average price of twenty-five cents per pound—a gain of six cents per pound, equal to $54,000,000. There is every encouragement and reason why the quality of butter should be improved. The range of quality is all the way from "grease" to "gilt edge" and a corresponding variation of price from eight to thirty-five cents per pound, and sometimes fifty cents and even higher; but thirty-five cents is a price within the reach of all who know how to make fancy butter. Oleomargarine is a good substitute for grease, a poor one for a fair quality of butter, and no substitute at all for good to fancy butter. The demand for the last mentioned quality of butter, will never be affected by the manufacture of it.

We have by our perseverance, enterprise, and skill, attained a high reputation on cheese. I am sorry to state that we are low down in the scale on butter. The East and West both make a finer quality, while our natural advantages are equal if not superior to either. Now, Mr. President and gentlemen, there is a cause for this, and allow me to say, that cause is mainly a lack of skill on the part of dairymen and butter makers.

I will endeavor to bring before your notice some of the leading principles of butter making. If the manufacture of butter only were the object to be attained, the first thing of importance would be to select good butter cows, regardless of breed, which give the proper quality rather than quantity of milk from which fine butter can be made. The quantity of cream rising on the milk does not always determine its value. The cream from the milk of some cows is much richer in butter than that of others, requiring a smaller amount to make a given quantity. The only way of determining all of this is by setting the milk and churning the cream of each cow separately and noting the result. Many would be found worthless for butter making, that are good milkers. The cows should be well cared for and properly fed with a view of producing a rich quality of milk. The stables should be well ventilated and kept clean; in fact, cleanliness should be strictly observed in the handling of milk in every particular. Nothing should come in contact with it that would offend the most delicate taste or smell.

Setting milk for raising cream is a question upon which there are many pet theories. In temperature it includes all the way from 32°, freezing, up to 140°, and in depth from three inches to twenty-five inches. I find by Professor Arnold's work on "American Dairying," that cream consists of the globules in milk which rise to the surface on standing, on account of having a less specific gravity than the milk with which they are mingled. The specific gravity of milk is about 1.030, while that of cream is about

0.985. The difference between the two brings the cream to the top. The cream rises best on a falling temperature, because water, of which milk is chiefly composed, is sooner affected by heat than fat is, and it contracts first by the cold, thus increasing the difference of specific gravity and hastening the rising of the cream globules. Milk new from the cow, stirred in a way to prevent any cream from rising until the temperature is reduced to between 50° and 60°, and then set for the cream to rise, and the temperature kept uniform till the milk sours, will throw up all its cream. It will be seen by this that 50° to 60° is the most favorable temperature at which cream will rise; but for the reasons above explained, milk set at 140° and reduced in temperature 80° will send all the cream to the top; or milk set at 98, its temperature when it comes from the cow, and reduced in temperature 32° to 40°, will do the same.

This last plan is the Swiss plan of raising cream. If the cream is to be raised on milk set exposed to the atmosphere, and depending on it for cooling, it is best to set in pans from three to five inches deep. Unless the temperature of the room in which the milk is set is about 60°, the milk will sour before all the cream rises. This makes it necessary, in most cases, in hot weather, to use ice or water, or both, in cooling the milk, and for this use various kinds of pans and pails have been invented, most of which are an improvement over the old way. I have no doubt but that you are all familiar with the different kinds, so will not describe them; but which ever kind is used, the depth at which the milk is set should be governed by the length of time it remains sweet. Any plan requiring a longer time than forty-eight hours for all the cream to rise should not be adopted. If the milk is set in deep vessels, or in large quantities, it should be thoroughly aired before setting.

As a rule, the milk should be skimmed when slightly acid. Any way that is most convenient will do for skimming. A little milk taken off with the cream is a benefit. The cream should be kept from the atmosphere both before and after skimming. It should develop a certain degree of ripeness, which can be known by a moderate sourness, and it should be equally advanced before churning. Sweet cream is, also, benefited by age. Sour cream will make more butter than sweet, and, as a rule, better in quality. Sour cream should be tempered for churning at 60 to 62°, and sweet cream at 57 to 60°. If the temperature of the cream before churning is too high, it should be reduced by ice water; if too low, a pail of hot water should be placed in the cream, and kept floating until the desired temperature is obtained, or hot water may be added while slowly stirring the cream, if no other means is at hand.

There are many different kinds of churns. The old dash churn is the one most in use. The dasher should be free from notches and holes, with a concave bottom, and filling about three fourths of the area of the churn at its largest diameter. Such a dasher is harder to operate than a smaller one filled with holes, but it will not break the grain of the butter, and will bring it quicker. The motion should be slow. In every stroke the dasher should be lifted above the surface of the cream, and lowered as near the bottom of the churn as possible without touching. At the commencement of churning the motion should be slow till the cream is well mixed, when the motion may be increased to about forty strokes per minute in sour cream, and from fifty to sixty in sweet cream. When the butter begins to come, the motion should be slackened and enough cold water added to reduce the temperature to 58°. The butter will then come in kernels like grains of wheat. This may be known by a complete separation of the butter and buttermilk on the staff of the dasher. No attempt should be made to gather it into a solid mass; but the buttermilk should be drawn through a sieve, water added to the butter and stirred and drawn off in the same way until clear. It is better to get rid of the buttermilk in this way than to work it out. The butter should then be taken out of the churn and placed in a room or cellar to drain at a temperature of 60°, that being the best temperature to handle it. After draining a short time, it should be salted with pure salt that will dissolve readily, at the rate of three fourths to one ounce of salt to one pound of butter. Great care should be taken to thoroughly mix it without injuring the grain of the butter. The salt will not preserve the flavor of the butter, but should only be looked upon as a seasoning. After salting, it is better to let the butter stand till the next day, when it should be worked by pressure, (not friction or grinding) enough to make it uniform in color and expel an excess of brine. Enough should be left in the butter so that when tried, brine will stand in clear small drops on a tryer. If the salt is properly incorporated, but little working will be necessary the second time.

More butter is overworked than underworked. Great care should be taken in working not to destroy the grain of the butter, thereby making it greasy, injuring its flavor and keeping qualities. The butter should be packed in suitable tubs or firkins, by pressing it in with a ladle. The package, if of wood, should be white oak, and thoroughly soaked, first with water, and then with hot brine, to draw out the sap and gum, and fill the pores of the wood with brine, thereby making it air-tight. If the butter is to be kept a length of time, it is better to pack in firkins. I will give Professor Arnold's plan: "Put in a layer of salt one half inch thick in the bottom, then pack the butter firmly to within one half inch of the top; fit a circular piece of muslin, having a diameter one inch greater than the firkin; after wetting the muslin with brine, spread it smoothly over the butter, and tuck the edge down by the side of the firkin, fill the space with salt, head up, and remove to the cellar. The end having the muslin on, turn down, in the head which was before down, but is now up, a five eighth inch hole is bored, a saturated brine of pure salt is pored into the hole till the head is covered; the hole may, then, be loosely plugged to exclude the light, and, at the same time, allow the brine to soak through.

I have only described the dash churn. Any churn that churns by concussion, or thoroughly agitates the cream without too much friction, is correct in principle. Some of the revolving churns are easily operated, and do their work well, and have an advantage in mixing the salt with the butter before removing it from the churn. The ladle and bowl is the best butter worker for a small dairy. When a large quantity is handled, a slab or an incline with a lever, which should be operated by pressure, would be best. Ice should never come in contact with butter. At seasons of the year when butter is light in color, it is an advantage to use an annatto extract for coloring. It should be mixed with the cream, and enough used to make the color of the butter a trifle under rather than over a natural color. The cellar or room in which the butter is to be kept and handled, should have a dry pure atmosphere, at a temperature as nearly 60° as possible.

WASTES OF THE DAIRY.

By H. COOLEY GREENE.

"The savings of the dairy" would be a more congenial, and, perhaps, more profitable theme to discuss, but unfortunately savings was not the topic assigned me.

Dairymen are often mentioned as the class of farmers who own large farms, build large barns, drive large fat horses, and milk large herds of large cows in large pails, from the large profits of which they are enabled, by rapid degrees, to enlarge their acreage, their investment in bonds and their consequence in society. And this magnificent idea of the characteristics of the happy kine man is not altogether an extravagant one. In a great measure it is a well deserved compliment when he is spoken of as a man of marked prosperity and intelligence. It is not too much to say at the outset that the dairymen of the land include, at least in the dairy sections, the cream of the farming community so far as intelligence and enterprise are concerned.

It would seem absurd therefore to write essays on the wastes of the dairy, but alas, it appears that dairymen are just as unlike as other men, and the contrasts between the best management and common management afford sufficient proof of the statements I am about to make.

By careful inspection we shall see that dairymen waste more than they save. If all their wastes could be converted into savings, their income would be increased more than a hundred per cent.

I use the term waste in its literal sense, as meaning more than ordinary loss.

The loss of one man may become the profit of another, as for instance, when one sells an article for less than its real value, while the seller loses the buyer makes so much more than his legitimate profit.

When a mechanic converts good material into a poor product he wastes, and by his waste no man can be profited. It is equivalent to destruction by fire.

The wastes of which I am speaking are of precisely this character, entailing absolute loss.

Let these wastes be stopped, and the possible proceeds of the dairy be saved, and for the dairymen, the day of jubilee will be at hand.

Fundamental to the whole system of sewerage by which dairying is drained of its profits, are the mental habits of those who gain their sustenance from it, and find their employment in it.

We often hear it said, that "man is the creature of habit," and this is true to a far greater extent than we are accustomed to think.

What is habit? It is simply doing a thing over and over till we come to do it automatically. It almost does itself.

Life is a series of repetitions, and almost an unbroken series of habits.

About the only natural thing a very young man does on entering this world of woe is to snuffle and cry, and in a wonderfully short time this becomes habitual.

The first step he takes learning to walk is taken by a great deal of hard thinking and many awkward movements. After a time he can walk or run without any further effort of the mind. A person unaccustomed to it finds great difficulty in walking through the forest. The bogs, the logs and twigs are ever in his way.

The native woodsman by force of habit vies with the hare in speeding through the thickest wood.

The printer begins setting type by looking very carefully at every letter to see that it is the right one; right side out, and right end up, giving to each piece his entire mind.

The time comes when no special thought is required, the mind and the fingers have taken the habit, and he carries on conversation without interruption to his work.

So it is true, that while we are the veriest slaves to our evil habits, were we not susceptible to the force of habit, we could not possibly discharge the affairs of life. By it we are enabled to carry forward the various details of business, while the mind is left free to act when special thought is important.

The great difficulty with most farmers is, that the routine of family life becomes a matter of routine merely, and those departments of the business that require special thought and study, come to be done in a mechanical way, and the farmer becomes a mere automaton, rather than the thoughtful, studious man he should be. The force of habit tends to stereotype the life, and render it unprogressive and unsatisfactory.

The various processes of the farm are done as a matter of course, not as a matter decided upon as the result of careful thought. The mind works into ruts, and the whole life is narrowed down to the mere force of habit.

Now, there are few avocations that call for more vigorous and constant activity of mind than the dairy business, or that pay more surely for this kind of investment.

Though a man may not by taking thought add one cubit to his stature, yet there are other things he can do that conduce to his prosperity and happiness.

"Intelligent, independent thought is the needed remedy for most of the wastes of the dairy."

No man would buy an inferior cow, if he realized that inferior cows never pay, and here is one of the worst leaks in the dairy.

It requires a pretty good cow to pay for her food, to say nothing of risks, inevitable depreciation, which average about five per cent. annually on the cost price. The cost of keeping a cow a year is ordinarily twenty-five to thirty dollars. What proportion of the cows of the country produce thirty dollars worth of butter in a season? Dairymen would be surprised to see them counted out.

And where is the profit in keeping a cow that barely pays for her food? Where is the reward for labor of milking, feeding, and all the drudging involved? Verily the farmer is willing to do more work for less pay than any other man I know of.

Find a dairy of forty cows, producing six thousand pounds of butter, and you find a dairy fully up to the average.

Count out the best ten, and you have a nice little dairy that will yield two hundred and fifty pounds per cow, or two thousand five hundred pounds total.

Count out the next best ten, and you have another nice little dairy that will yield one hundred and seventy-five to two hundred pounds per cow—say two thousand total. This accounts for four thousand five hundred pounds of the six thousand, leaving only one thousand five hundred pounds as the product of the twenty inferior cows—seventy-five pounds each for an average.

If any man thinks this is an unfair estimate, let him keep the product of each of the forty cows separate for a season, and report actual results.

I believe the statement of Professor Arnold, that "the profits of the dairy business are made from a small percentage of the whole number of cows kept," to be literally true.

The man who knows enough to select a perfect dairy, and so manage it as to keep it up to full productiveness for a term of years, knows enough to do credit to any position to which he may be called.

If the keeping of poor cows is a great waste, the keeping of cows poorly is not less so, and for many reasons more absurd. Everybody knows that a given amount of food is required to sustain the life of a cow, and that if no more than this is given her, she can give no profit. You cannot force even the submissive cow to give something for nothing. The failure to provide well for the needs of the cow, both in summer and winter, while she is preparing to give milk, as well as while giving milk, is one of the commonest errors of dairymen.

The cost of producing a supply of green corn, to bridge over the space of short and dry pasturage that often occurs, is not great. If the drought come, and we know it may come, the trifling cost may be returned fourfold in the quality and quantity of milk it may produce. The matter of stocking pasture with improved varieties of grass, and ridding them of the burden of noxious weeds now produced, by drainage, and mowing, and grubbing, as well as by improved culture, has not yet received the attention it demands. A great deal, but not enough has been said about the effect of noxious weeds upon the quality of milk. The effect of all this talk is not apparent as it should be. Weeds of all names, and weeds without name or number, still cumber the ground and lift their heads defiantly, destroying the flavor of your milk and worrying the life out of your cheese makers, and depreciating the value of your butter and cheese, inviting the besom of destruction, yet undisturbed. If, when they next appear, you will not as yet hew them down, as Saul did Agag, will you not do yourself the credit, your cows the favor, and some industrious tramp the kindness to employ him to go over your fields and destroy, root and branch, this unsightly waste of your dairy?

The army of tramps that go begging for work and bread might be utilized to some extent, you will class those few meals among your best investments, and "the world will be the better for it."

The starving out of the soil by heavy cropping and poor culture is hardly a less evil than the starving of the dairy, since one is certain to result in the other.

Harsh, abusive treatment of cows, neglect to shelter them from cold or storms, at any season, compelling them to stand in mud to their knees, shivering, when they should be in a warm stable chewing the cud of contentment, irregular hours for milking,—these, too, are sins for which the dairyman must give an account at the milk pail. "The merciful man is merciful to his beast," but he has no bowels of compassion who will not regard the plaintive lowing of his shivering cow.

Jones and Brown are neighbors. Jones has two hundred acres of land; Brown owns one hundred acres. Jones keeps twenty cows; so does Brown. They patronize the same factory, so we know just how their dairies compare. Jones has his cows come in milk in May and June, because he thinks it costs too much to keep them up if they come in before grass. He has so much to do all winter that he finds it easier to feed in open sheds, and a stack "up on the hill medder." The winds blow away a good deal of their rations, and then at the period of maternity the rope and pulleys are brought into requisition to set them on their feet, while the gentle zephyrs of spring waft away the feeblest to the spirit land. Jones says, "Aprile is a hard month on horned critters, but if he gets 'em through to grass, he calculates they'll make a live on't."

Brown understands the selection of the fittest, and when he finds a first class cow, he buys her as low as he can, but never allows five or ten dollars to prevent her falling into his hands. If a cow fail, as good cows will fail, she is converted into beef, and her place filled by a good milker. Brown's cows come in milk in March, and he converts his early cut hay, roots, and grain into fifty pounds of fine butter per cow before Jones gets a drop of milk. In stormy weather, at any season, Brown's cows may be found comfortably housed and rejoicing in plenty.

Jones gets credit on the factory books for two thousand five hundred pounds of milk per cow—fifty thousand pounds altogether—at eighty cents per hundred net—more than such milk is worth. Four hundred dollars for his dairy—or twenty dollars per cow.

Brown is credited with four thousand five hundred pounds per cow; ninety thousand pounds at eighty cents per hundred, less than such milk is worth—thirty-six dollars per head, $720 for his dairy.

The difference in net yield between these two dairies is only eighty per cent, of Jones' income, while Jones, with his two hundred acre farm gets from his dairy but fifty five and one half per cent, of Brown's income from half the amount of farm.

True, Jones kept a few sheep, just enough to go over the pasture every morning and nip off every fresh clover leaf before it gets up high enough for a cow to get her tongue around it. He also keeps a few colts, and after them and the sheep, the poor cows find "short nipping."

These suppositious cases have their parallels in every dairy community. It is patent to all that the difference in degree of prosperity centers in the head.

By force of habit Jones is "penny wise and pound foolish." By force of habit his mind has fallen into the ruts of thriftlessness, from which he is not able to extricate himself, while, by force of correct habits, Brown brings his best thoughts to bear upon his business, makes it a point to master the problems of economy as they present themselves, and thus his labors are crowned with success.

I have spoken of some of the wastes that precede the handling of milk. These are enough to indicate the line of success or failure throughout the subsequent processes.

If a man be wise in the important department of selection, feed, and care of his stock, and there be a failure in the handling of his milk, though the fault may be another's, yet all his carefulness goes for naught. Some things must be left to the care of the housewife, and if she be incompetent or indolent, there is opened a door by which the most discouraging wastes enter.

It is not easy to determine which bears the greater weight of responsibility for wastes, the dairyman or the dairywoman. Either may be ever so wise and diligent in their own department, and their best efforts be neutralized by the incompetency of the other.

How often is the unsalable character of the butter traceable to lack of skill or care in the manipulations of the milk-house.

The pails, pans, and other utensils of the dairy being neglected, the cream takes on a putrid taint, or the odors of the kitchen, as is often the case are condensed upon the cream, and the butter tastes of everything but butter. The cream is not taken off till it is spotted with mould, or is kept till ruined before churning, or is not tempered at churning, and is then churned to death, or the butter worked to death, being salted with coarse salt, the crystals of which cut and destroy its texture. It is by these little, and yet very important wastes, that the best of milk is converted into white, frothy, cheesy, rank, or greasy butter, that is shunned by dealers, cursed by consumers, and that reverts with a double curse on the heads and pockets of the dairyman.

And yet, dairymen, knowing these facts by sore experience, are slow to invite their better halves and their daughters to come out with them, and attend meetings where these matters are discussed, or to interest them in reading and the various means of grace now available, by which they might learn a more excellent way, and be induced to walk therein.

We need a stimulus to better efforts in the female department of the dairy business.

We are happy to see that a few of the ladies take sufficient interest in their household welfare to bless us with their presence.

Ladies, you will not, I am sure, be offended with this mild reminder of your share in the dairy interest, and the degree of responsibility resting upon you for the wastes of the dairy.

I might go on at length, to speak of a thousand and one ways in which the dairy suffers by waste, but I know that your patience would be wearied, if, indeed, it is not already, by a further review of this uninviting subject.

You need not be reminded of the imperfections of the cheese factory system, while, in the nature of the case, and the present state of dairy science, blame and loss too often falls upon those least to blame.

Every recurring season, with its experiences, proves to you anew that the dairy is as full of leaks as a sieve, and that with the existing forces of competition, and the growing fastidiousness of the best market, it behooves every man and every woman engaged in the business to study, thoroughly, the ins and outs of their calling, to avoid the deep-worn ruts of thoughtless habit, and seek for greater knowledge as the only means of securing satisfactory results.

WHERE DOES THE RESPONSIBILITY REST?

By D. C. Root.

In former discussions it has been taken for granted that quite a large percentage of the milk delivered at the factories is good, and free from all spores and taints, and that it should, and would, if properly worked up by a competent workman, make first class goods. But there is also a large percentage at times—quite too large—that is not good, and cannot be made into good cheese. Added to its other bad qualities, as feverishness, filthy cans, &c., it often contains considerable quantities of *fertilizers*, and is festering with putrefactive corruption.

Now, suppose these conditions to represent one day's milk of ten thousand pounds, and that the bad milk is ten per cent. of the whole, or one thousand pounds, while nine thousand pounds are good. I ask, what shall be done with it? Manufacturers will say, work it up all together, of course, what else can we do with it? And this is just what is generally done in such cases.

Let us see the results, for I claim there is a wrong perpetrated upon the best patrons.

The results will be what they have been, are, and will continue to be so long as proprietors of good sound milk will submit to this evil practice, namely, the value of the poor milk, which has been worse than lost, is thereby enhanced at the expense of the sound milk.

Ten thousand pounds of milk makes nine hundred and nine pounds of cheese, worth, at ten per cent. loss in quality, nine cents, or $81 81. Now, let us see what might and should be done with good milk. As is often stated, it will make ten per cent. more product than when mixed with poor milk. Thus, nine thousand pounds of sound milk makes nine hundred pounds of cheese worth ten cents a pound, or ninety dollars.

Here we see that, if the one thousand pounds of poor milk were to be thrown away or fed to the swine, the cheese produced from the good milk alone would be worth more money by $8 18 than when all the milk is worked up together, or, in other words, the patron who furnishes the worthless material carries off more than ten per cent. of his neighbors' money.

It does look to me, from a financial stand-point, that if the milk were all furnished by ten patrons, each having one thousand pounds, that nine of these patrons would make money by sending their milk to some factory, where they could have their sound milk worked up by itself. I say let the poor milk be worked by itself, if worked at all, then the owners of good milk need not suffer loss by it. Why compel a man to pay a royalty on his shiftless neighbor's tainted milk?

Now, I think if we have competent cheese makers, we shall stand or fall in the quality of our goods in proportion as they admit or reject the bad milk, and that point should be under the control of the manufacturer, without fear or favor.

Let us give him no chance to shirk his responsibility or duty, by assuming that some of the cows got mad, and therefore give bad milk, that can not be detected, except by scientific analysis.

Admitted that in here and there, an isolated case, bad milk has been traced to what I will term mad cows, stool-pounded cows, or dog-chased cows; but if the manufacturer can shirk responsibility upon mad cows, so can the patron, and therefore *nobody is responsible for bad milk!*

We see more or less bad milk, delivered day after day at our factories, but the inspector says, "That is bad milk, not fit to work; but if I do not work it, but send it home, it will go to some of my neighbor factories, and I may as well have the profit of working it as they. The owner is Mr. A or Mr. B, one of my best patrons, and I can't afford to offend him." So the milk is dumped into the vat, to become a curse to the factory and a loss to nine tenths of its patrons.

This is the policy of our factories, to which they are driven by competition with each other

Is it a just policy? Is it wise? Is it honest?

I say any manufacturer who knowingly mixes bad milk with good, to work up at a loss, should be held responsible for the consequences.

The New Departure.

During the months of June and July, a new departure was instituted by the factories of Crawford and Erie counties, being a series of visits and lectures by Professor L. B. Arnold, of Rochester, New York. Some twenty factories combined at the outset to engage the services of Professor Arrold, sharing the expense equally. Afterward several others joined the enterprise, making in all nearly thirty factories.

The plan was to have the Professor visit each factory by day, examine the milk as received, and inspect the process of cheese making throughout, giving such hints and instructions over the vat as might seem appropriate. In the evening a meeting of patrons, previously well advertised, was addressed in familiar terms on topics more particularly relating to patrons' duties and privileges—the production and care of milk.

The design was to bring both patrons and cheese makers under the tuition of one who, having been a practical cheese maker and a close observer of cause and effect, with a particularly keen eye to the *little but significant* causes that often determine the character of the product, is qualified to teach.

It was believed that by bringing the best instruction right to the sources of milk and cheese production, not only a more uniform, but a higher grade of cheese would be produced in this section.

In the main, the results were quite satisfactory.

It was not forgotten that in cheese making there can be no arbitrary set of rules laid down.

The peculiar nature of milk, and its multiform developments, under slightly variable conditions, forbid it. The best that can be done, is to learn enough of these developments and their tendencies, and the means of regulating them to bring them under proper control and approximate uniformity of result. The day for anything more than *approximate* uniformity is yet far in the future.

SPECIAL COURSE OF DAIRY LECTURES.

By Prof. L. B. ARNOLD, *of Rochester*, *New York*.

CUSSEWAGO, *June 18*.

The first meeting of this special course was held at the church near Cole's factory this evening. The church was densely crowded with patrons of Cole's and Nash's factories, and not a few from greater distance, of factorymen, cheese-makers, co-workers, and candidates, all eager to learn from the great apostle of dairy progress.

The meeting was called to order by Mr. John Cole calling to the chair Mr. L. C. Magaw, who made brief remarks, and invited Mr. A. M. Fuller to state the object of the enterprise, which he did, as follows:

Mr. PRESIDENT: I am with you to-night rather as a listener, than with any intention of taking an active part in your meeting; but, as I presume I am mainly responsible for the suggestion which resulted in the adoption of this course of lectures, it may not be inappropriate on this the opening night meeting to offer a few remarks explanatory of the object, scope, and purpose of these meetings. The association has from time to time, endeavored to influence a larger attendance of patrons at our association meetings; but it has seemed impossible to arouse any interest upon the part of patrons; hence, the class benefited has been almost exclusively manufacturers, cheese makers, and a very limited number of our more enterprising dairymen.

This plan of holding patrons' meetings at our own thresholds was suggested, believing that this might possibly lead to the attainment of the object sought. It was the opinion of the best informed in the business that our factory men, cheese makers, and salesmen are fully up to the average of other sections; but that our patrons need to devote more thought and adopt the best practices in their department of the business in order to attain the high standard of other and older dairy sections, and it is hoped that these meetings will result in much benefit to patrons, and not only to patrons, but alike to all interested in the business.

I would say further, that the association has provided a reporter in the person of our secretary, Mr. Greene, who will furnish us with a full report of each meeting, to be incorporated in our annual report. As to the manner of conducting these meetings, it is suggested that Professor Arnold be questioned upon any and all matters pertaining to the dairy business, and that these questions be confined as much as possible to that which mainly concerns patrons. I may truly say that the eyes of other dairy sections are upon us in the attempt to sustain a course of lectures for the benefit of the dairy interest here. Let us therefore be alive to the importance of acquitting ourselves well in this matter as leaders in this new departure.

Professor Arnold was then introduced, and stated that his remarks would be very informal. He requested those interested to ask such questions as they saw fit, that he might in replying render his remarks pertinent to their wants, to the locality and its peculiar needs. The disconnected character of the address shows how faithfully he was plied with questions.

He might be regarded as heretical by cheese makers who prefer to follow the ruts already worn, but still he hoped he might be able to interest lovers of progress in some ideas which he regarded as valuable while new and would tend to work an innovation in the art of cheese making.

It is necessity which drives men out of old ruts into new modes of thought and practice. This is demonstrably true, particularly of cheese making. Prices of dairy products have fallen so low that it is barely possible for dairymen to live above water, and they begin to strive to lessen the cost of production and manufacture.

The first step in this direction is to provide good cows. Professor Stewart estimates that it takes two thirds of what a cow eats to sustain the life of the cow. I estimate it at four fifths. There is then but one third to one fith of her food which goes to make milk. Two thirds of the cows in the United States do not make their owners a cent of profit. Hence there is a great necessity for keeping better cows. It requires but a fraction more food for a paying cow than for one that is non-paying—one pays a profit of twenty to twenty-five dollars, the other nothing. Probably dairymen lose more from scant feeding than from any other source, if we except poor cows.

As regards reducing cost of manufacture, I have only to say that I believe it has been already reduced about as low as it can be without shutting up the factories altogether, which would result in a retrograde movement to the old methods.

Next, we need to increase the value of the product. We are apt to think that if a cheese will sell, that is all we want. This is a mistake, as I will illustrate by some experiments I have recently made. I compared full cream cheese, newly made, and a sample made last September with samples of foreign cheese. Some Holland, some English, Cheddar, and Stilton cheese, and some French Roquefort cheese. I took some pepsine and hydro chloric acid, and imitating, as nearly as possible, artificially, the gastric or stomachic juices and digestion by them. Samples of these different cheeses were subjected to the action of the pepsine acid, at the temperature of blood heat. I found the Roquefort cheese, two years old, containing about twenty per cent. of moisture, digested in one and a half hours; Edam in two hours; a third variety in two and one half hours; a fourth in two and three fourths hours; but the sample of our own make, nine months old, containing forty per cent. of moisture, required four hours for digestion, and even then by far the greater portion was left undigested.

My experiments in relation to solidity gave about the same results. In every case, American cheese took more time, and left far more sediment than the foreign makes.

To make good cheese, we must have good, pure milk. No good cheese ever was made of impure or diseased milk. The rennet must be pure, the salt must be pure. It is rennet that makes the cheese, and that digests it. It coagulates the milk into a solid form, and by continuing its action, reduces it again to a soluble form—very similar to the action of gastric juice.

The effect of whey in cheese making is to form an acid which obscures or overcomes taint, but at the same time whey contains within itself nearly all the taints and impurities of the milk. It has another effect also, to carry an excess of moisture into the cheese. Another effect of whey is, by the production of acid, to neutralize the active force of rennet in the curd.

It is not enough that the rennet has coagulated the milk. Its action must continue throughout the curing and maturing process, or we have a poor, indigestible cheese. Acid kills its action in the process of making and early curing, and is therefore objectionable, as it will be my purpose to demonstrate during my visit here. The little particles of hard, uncured curd in acid cheese are evidences of the toughening effects of the acid. The rennet property in those particles being entirely destroyed, they refuse to break down, and such cheese will never be fit for food, because indigestible, nor palatable, because the fine flavor has been neutralized by the acid action.

The samples of foreign cheese I spoke of were laxative in their tendencies, while American cheese is constipating.

The Edam cheese I have had on my table, you can eat as freely as you would eat bread, and feel no oppression.

Not so the cheese we are making. The best of our factory cheese you cannot eat as other food, because it is so constipating. When properly made cheese is nutritive as beef, and more so, but no constipating food can be healthful, and you cannot eat much of it. What is the remedy? To make our cheese properly, and not use so much acid.

Buyers tell us we need more acid. I say we need less.

We are apt to heat too rapidly. We heat merely to get rid of the whey. We use rennet to digest the curd or render it cheesy.

My way is to heat the milk to blood heat before applying the rennet, then you have no after heating to do, only to keep the heat up to the blood heat point; then the digestive process goes forward naturally. Curd does not ferment. The whey ferments and the curd feels its influence, and this also reacts upon the whey. You may notice when a curd is fit to dip it has a stale smell. The effect of this stale condition is to promote decay.

Brie cheese are as thick as my hand; they are packed in a barrel with chaff between them. If they ferment too fast they sometimes become liquified, the contents runs out and is bottled up and saved, as we save jelly and catsup, for future use.

The nature of digestion is to get the cheese back to its soluble form. We begin with a liquid and convert it into a solid; digestion reverses this operation. While I advocate an innovation, I would not advise too great a change at once.

If you undertake too radical a change at once, you may lose more than you will gain. But I advise a gradual change, beginning with the thorough ventilation of the milk at the dairy, and if no more, let the whey be drawn off as soon as the heat is applied.

A common fault is the formation of a taint from the lack of ventilation.

If your milk is well ventilated you may carry it two or three miles and its condition for cheese making will be improved thereby. It will make better cheese for this agitation. The hot iron test is a test of condition of curd rather than a test of acid.

I advise the drawing off of the whey at an early stage.

The curd will then become stringy, and will respond to the iron test even before acid forms. This is the method of making all or nearly all the cheese that has taken premiums in America, Canada, England, and everywhere.

In drawing off the whey let the curd pack at the sides of the vat, the whey passing off down the middle between the curd, turn over, and when drained quite dry and it will respond to the hot iron, having a stringy appearance and soft feel, break it up or put it through a curd mill and put to press, salting a little less than by the common method.

Question by Mr. NASH. Is it safe to use this method in working up tainted milk?

ANSWER. It is not safe to expect to make good cheese from tainted milk by any process, but this is better than the common method in tainted milk. By this means you get rid of a large portion of the taint which exists in the whey.

By Mr. FARRINGTON. What was the per cent. of water in the samples of foreign cheese you have spoken of.

ANSWER. Fifteen to thirty per cent; while in much of American cheese there is thirty to fifty per cent.

QUESTION. Is it the fault of our own cheese, that there is too little moisture?

ANSWER. Yes; too dry for the condition. Its condition requires more moisture than exists to promote the digestive action of the rennet.

We make our cheese, not to keep, but to sell. If we want them to keep we must cook them dryer; if we want them to cure very fast, we will allow them to retain more moisture.

QUESTION. Have you satisfied yourself whether the response to the hot iron test is the result of acid or digestive action?

ANSWER. I have. It is caused by both. I have tested sweet curds that would respond as fully as when in an acid state. Curd is not fit for pressing until it will respond to the hot iron test.

Mr. MAGAW would like to see the patrons drawn out to ask pertinent questions. Now let us have a flood of familiar questions, on any points where you feel the need of information.

Mr. FULLER. I feel that we want answers to simple questions of every-day practice, and especially applicable to the patron's interest. For instance, what kind of food should be used to keep up the full flow of milk, when pastures fail?

ANSWER. Perhaps the best food, that may be available to all, is sowed corn. Corn is very nutritious, and, when grown in drills, is very valuable for green fodder, to keep up the flow of milk.

Millet is also excellent, and every farmer should have a crop of corn and millet, for green feeding. Corn, being a very juicy plant, should be wilted for a day or two before feeding, to get rid of the superfluous amount of water. Peas and oats, grown together, are excellent, and will always pay for growing, when grass is short and dry. Wheat bran is a very valuable food, also, for this purpose. I would not feed it dry, but would wet it, and mingle it with coarse food before feeding. Sowed corn is best just while it is in blossom.

Mr. MAGAW. If you have any questions to ask on butter making, the Professor will be pleased to reply to them.

Mr. FARRINGTON. How far should cheese makers be held responsible for the spoiling of cheese with taints?

ANSWER. The control over taint is come to be so complete that cases are rare where the taint can not be so smothered or covered up that the cheese will be very salable, but not good. You can make a cheese that will sell, but you can never make a good cheese from tainted milk.

Mr. NASH. If you had a vat of tainted milk, that you knew to be tainted, which method would you use, the cheddar or the acid?

ANSWER. If I could do so, I would heat the milk to 140°, which would destroy the taint. If I could not do this, I would prefer the cheddar process to the acid process.

The causes of taint in milk are often very difficult to detect. It may be the quality of food, or over-eating of good food—taking carrion stench into the breath—or a disease of the cow or of the udder.

QUESTION. Can really fine butter be made in hard water districts?

This is a mooted question, but it is my opinion that while it is easier to make fancy butter in soft water districts, yet the difference in favor of soft water is not as great as many suppose.

The best ventilator for milk cans is a piece of wire gauze in the top of the cover, surrounded by a rim to prevent waste of any milk that may be forced up through the gauze.

This ventilator is not sufficient to serve as a cooler, but commonly, if properly ventilated, milk will not need to be cooled more than the air will cool it.

You should always keep your warm milk and the cool night's milk in separate cans. The night's and morning's milk should not be mixed till it is put into the vat. The mixing of milk in the cans is one of the great evils that injure flavor and promote taints.

Should butter be washed with water or not?

ANSWER. I dare not decide that matter. Butter may be spoiled by washing, especially in impure water. I once spoiled a batch of butter by washing in water from a low well. The butter spoiled utterly in twenty-four hours. I afterwards found the mud in the bottom of the well was "off flavor." If you wash butter you must use only the purest water. Well made butter will keep well, whether washed or not, if the milk be sopped out with a cloth. But the very best butter now made is not worked at all. The globules are cooled to a point when they will not cohere easily, dip it out with a ladle, rinse out the butter milk, salt it, stir in the salt and put into a tub, merely pressing it together and not working it at all.

A sample of butter was presented to the judges at the centennial. It was made from Jersey cows milk that was put into pails closed up at once, and immersed in ice water till the cream raised. It received an award, although it had a cowey smell. Experts could detect it, though many people, especially those who use tobacco, or whiskey, or hot, seasoned food, having their taste thus perverted, could not have detected it. Such people require food to be quite highly flavored or they call it insipid. This butter was made by the Hardin method, as we afterward learned.

If your cream is perfectly pure, butter will be better made from sweet cream. Heating milk is the best means to insure freedom from taints. Flecks usually come from a feverish condition of the cow. The remedy is to cure the health of the cow or to heat the milk perhaps to one hundred and sixty degrees. This will kill the germs which act upon the milk about them converting it into hard curd, which we call flecks.

If milk is colder than the surrounding air, a moisture will be deposited upon the cream, which will be very impure and injure the quality of the butter seriously.

What brand of salt would you use for butter or cheese?

The best I could get. I regard the Onondago factory filled as good as the best.

A good cow weighing one thousand pounds should give five thousand to six thousand pounds of milk, or five to six times her weight in a season. A good milker must be a good feeder.

Give no cow more salt than she will freely eat. Do not force her to eat more than she craves, but give her all she wants all the time.

GUY'S MILLS, *June 25.*

IRA HALL called the meeting to order, and introduced the speaker, who said:

I am here not to make a speech, but to answer questions, and shall rely upon you to give directions to my remarks.

Mr. HALL suggested "The care of Milk at the Dairy" as a topic for introduction.

The quality of milk is determined by many circumstances, not the least of which is the food of the cow. Whether the food be of good or poor quality, she should be supplied with plenty, so as not to become hungry, and then gorge herself to excess. Too much food at a time renders her uncomfortable, and whatever renders her uncomfortable will tend to injure the quality of her milk. The annoyance of flies even, or reckless driving, and many such things have this effect.

I once had a cow driven furiously by a dog quite a long distance to the milking barn. The result was a very small yield of feverish milk, which spoiled my cheese, and it was several days before the cow regained her normal condition.

A factory man in St. Lawrence county, New York, had a case of taint which he traced to one cow, and to one diseased teat of that cow. This shows the necessity of watchfulness in these matters.

I infer that Satan is the father of nastiness, because I have read that cleanliness is next to godliness. Certainly, one of the greatest evils that befall dairymen is nastiness.

No wooden pail is fit for use in the dairy, whether painted or not. The milk enters every crevice in the pail, and there adheres till it becomes decayed, and taints the milk. Milk sugar once dried down is very hard to dissolve, hence nothing short of most thorough washing and scalding will suffice.

It does seem strange to me, that dairymen should be so stupid or so perverse after all that has been said by speakers and writers, and experienced by cheese makers, as to neglect the simple but essential matter of ventilation.

No man who has a nose can draw the cover from his can at the factory, on a sultry July morning, without catching the fumes which betray the ruin that is being wrought in his milk by confining and multiplying the germs of putrefaction. If dairymen will do as well as they know how, and use the knowledge they have, they will succeed in deriving from their business more enjoyment and more profit.

It is idle to expect satisfactory returns from your factory product, with all the skill your cheese maker can bring to bear, unless you do your part well. You have the first care of your milk. Learn to take proper care of your property, and then you may with more justice find fault if your cheese maker does not make you a fine article of cheese.

I knew a case where the cheese maker asked the privilege of getting ventilators put into the covers of all his patrons' cans, at his own expense. All he asked on their part was that they should leave their cans at the factory while the tinner did the work.

This was a reasonable request, surely; but how was it met? His patrons utterly refused to leave their cans, or to have any ventilators inserted at all. "It was all nonsense, this talk about ventilating milk to free it from animal odor."

Factorymen, however, are well aware of the troubles they experience from this source, and notwithstanding the patron would reap tenfold more profit by it than they, could well afford to bear the expense of getting every can provided with a wire gauze ventilator, the best and cheapest ventilator obtainable.

In your practices here I think you can cool milk sufficiently, in most weather, by spreading it thin and stirring till the odors have escaped.

You have no idea of the value of dipping and pouring to save milk. Better by far that milk should be stirred in this way, without cooling, than cooled without stirring. I have very little faith in any cooler that does not agitate and ventilate the milk. In butter making, however, the milk should be set thin, and not agitated much, to prevent the free rising of the cream.

SHEAKLEYVILLE, *June 26.*

Sheakleyville has again led off in the direction of improvement. The first teachers' institute in north-western Pennsylvania was held at this place, and now she takes up the second innovation by holding the first dairy pic-nic.

The success of this enterprise will, no doubt, lead to others of like character in other places, and why not? Why not call upon the old and the young to rejoice at the progress that has been made in dairy matters?

The gathering was large, large enough, for there were as many as could crowd within hearing distance of the speaker's voice, which is not feeble, and more than this at any public meeting is superfluous. The annoyance of having a crowd of interested listeners surrounded by a mass of babbling noise and confusion is a serious drawback on the usefulness of a very large mass meeting, but on this occasion all who would listen could hear. All who heard were evidently intensely interested in the address.

Professor Arnold was in "good trim," and did full justice to himself and his subject, as was proven by the closeness with which his novel theories were followed, and the terseness of the questions which were put to him at the closing of his remarks.

Specimens of new grasses were presented to him at the close for his opinion as to their utility for dairy feed, and samples of butter were placed upon the stand for inspection.

Next to the interest manifest in the subject of the address, the most marked feature of the occasion was the tender care and great respect shown for the many aged people present. There were several honored couples of this class, evidently pioneers of the early days, who have outlived their generation, but not their interest in human welfare. To the mind of the writer it was a spectacle of deep interest to see that circle of grand old people, from seventy-five to eighty-five years of age, who have, no doubt, some of them at least, beheld "their seed of the third and fourth generations," chatting together in a lively social manner, and enjoying "the good things of the land." Several of these are veterans of the war of 1812, and no doubt re-called the days when the howls of the wolf and screams of the panther, and perhaps the whoop of the warrior sent terror to the hearts of their wives and little ones, on the very spot where now was the scene of festivity and rejoicing.

The table, bountifully spread with good things, and the music of the Sheakleyville band were features of the day that contributed their part to the enjoyment of the people.

At about two, P. M., Mr. L. **Morrison** called to order, and the meeting was placed in the hands of the veterans, by calling to the chair as president, A. Dunham; vice prsidents, James McCracken, David P. Long, Richard Custard, E. Cozad, and A. Brice, Esquire. L. Morrison was made secretary.

The object of the gathering was stated by H. **Cooley Greene**, who introduced to the audience Professor L. B. Arnold, as one at whose feet we may all sit who desire to learn of the peculiar characteristics of milk and its products.

Professor **Arnold** commenced by saying this was the first occasion of the kind he had ever seen, but he took it as an omen of progress that so many people could be collected from a single locality, to listen to an address upon the subject of the dairy. There might well be a growing interest among the producers of milk, when it is remembered that the production of cheese and butter have reached the astounding aggregate of two hundred and fifty million pounds of the former, and one thousand million pounds of the latter.

You have a country here, most favorably adapted, in soil and water, to the production of this great staple. I perceive, by inspection of your cheese, that the milk produced here is high flavored, and its cheese making properties of a high grade. I am here, however, not so much to praise and flatter your vanity, as to criticise your practices, and, if possible, point out a better way.

The first fault I have to find with Pennsylvania dairymen is, that they do not use the right sort of cattle for dairy purposes. In this matter you are sadly behind the times.

There are among native cows many excellent milkers, it is true, but only about one in three are good cows. You are, therefore, raising and keeping three cows to get one good milker.

If you will keep Ayrshires, you will find that about seven out of every eight are fine milkers. Thus, in a herd of twenty-four natives, you will average to have eight good cows, while in the same number of Ayrshires you would have twenty-one. Now, as it takes all the product of an inferior cow to pay for her feed, you will see that the difference in profits between eight good cows and twenty-one good cows is the difference in favor of the Ayrshire herd.

The same would prove true of some other breeds; for instance, the Short-Horns of milking strains, or the Holstein, or Dutch cows. The proportion of good to poor milkers would be about the same. The only trouble with the Short-Horns is that they have been so largely bred for beef, that in some families the milking propensity has well nigh become extinguished, but in those families that have been bred as milkers, the milk producing tendency has been wonderfully developed. Holsteins are an excellent breed, and rank side by side with the best as milkers.

One cow in Oneida county has this season produced ninety-four pounds of milk in one day, and I have seen a dairy in the same county that produced nearly a thousand pounds of cheese per head in a single season.

From these extreme examples you may see the possibilities that may be reached by careful breeding and selection, coupled with skill in feeding and handling, for it requires a combination of all these to reach the best result.

Does it cost a little more to keep a cow well than poorly?

The increased return pays doubly for the extra cost of food.

Blood is seventy per cent. water, while milk is eighty-seven per cent. water.

Hence your cows must have an abundance of pure water, not once a day, but often, just as often as they wish to drink, which in hot weather is quite often.

The enterprising large farmers of the West have their pastures supplied with windmills at several points to provide their stock with convenient water.

I have known a loss of nine per cent, in yield of cheese simply from having the water so inconvenient of access, that the cows would only go to it once a day.

The speaker then described the process by which butter may be resolved into its several distinct oils.

Butter Globule.

This is the only element of milk that constitutes its value for butter.

The butter globule is a minute oval particle inclosed in a sac.

The contents of this sac exist in layers like the contents of an egg.

The first within the sac is a very volatile oil, and answers to the white of an egg. Within this is another oil a little harder, and possessing different properties, and so on, one within another, are several different oils, some designed to flavor, some to color, and some to give body or solidity to the butter.

Now, as an egg is spoiled, and soon goes to decay, when smashed, so with these globules. If left intact, they give the butter a bright color, sweet flavor, and sound body; but if broken up in churning or in washing, they become pale, dull of color, the taste is injured, the fine aroma escapes or is covered up and destroyed, and the butter has a greasy texture.

Milk Secretion.

The mammary glands are for the purpose of converting blood into milk, and conveying it to the teat. The blood is conveyed to the gland, which is placed at the termination of the veins, where it absorbs a portion of the blood, which, in passing through the gland, is changed into milk. The milk is deposited in minute particles into a small cup, shaped like an inverted bottle, having, at its base, a tube to conduct its contents downward through the udder. Into this cup or follicle, the milk drops as it is secreted. The surface of the follicle is coated with minute cells, which swell and grow outward till little balls are formed, which shed off into the follicle in succession, and pass down through the duct. These little drops are the butter globules, and this is the way they are formed from the blood of the animal. Each follicle empties its contents by these tubes into other follicles of larger size, and they, in turn, into others, till finally the milk reaches the reservoir, at the base of the teat, which is about the size of an egg; while, as you approach the base of the udder, these reservoirs or follicles are smaller and smaller, till they reach the size of a pin's head. At the base of each follicle, and at the entrance of the tube, there is placed a delicate diaphram, with a small hole in its center, through which the milk is filtered.

Why is Strippings Richer than Common Milk?

In its progress through these operations, the butter globules do not pass as freely as the more liquid portions of the milk, but linger behind, and only get down to the teat with the last of the milk. This accounts for the fact you well know, namely: that the first milk drawn is the poorest, and the last, or strippings, the richest in the mess.

The common theory that cream rises in the udder as in pans after milk is drawn, is therefore a false theory, for it is utterly impossible for either cream or milk to go up in the udder, though it may be absorbed by the glands, and pass into the system, if not drawn when it should be.

How Do Cows Hold Up Their Milk.

I have described the little membrane or diaphragm with a hole in its center, through which the milk must pass to reach the teat. Now, this orifice is surrounded by a very fine cord, which being tightened, closes the orifice, and stops the flow of milk. This system of puckering strings is connected with the muscles of the abdomen. When the cow draws up her abdomen, she draws these cords tight, and if there be not quite a pressure of milk in the udder, she will hold it all up. If the udder be nearly full, the udder will, in a measure, overcome her efforts to hold it up, and a portion will pass through.

Now for the application:

If the cow switches her tail in your face, bear it in patience; for if you give her a whack on the back with the stool, she will draw up those puckering strings, and you will not get all her milk.

If you leave a portion of milk in the udder, remember you leave the strippings, which is the cream of the mess. Now this strippings once left can never be obtained, but it will be taken up by the glands, and consumed to keep up the heat of the system.

The relative value of cows for the production of cheese depends both upon the amount of butter and the amount and quality of casein contained in their milk.

A factory in the valley of the Kennebec, supplied with milk exclusively from Alderney cows, requires only eight pounds of milk for one of cheese. Ayrshires average ten to fifteen per cent. of cream on their milk. Jerseys' milk shows about fifteen to twenty per cent. The sample of grass I hold in my hand is orchard grass, a most excellent substitute for sowed corn as green food, and it has this advantage over corn, that you only need to plow and sow it once in a long term of years. It is a rapid and luxurious grower, and makes a fine quality of food for milk.

And this other sample is a species of Poa, of which our June grass is one variety. It is not the Kentucky blue grass, but is finer and paler in color. It is no doubt a useful meadow or pasture grass. It is sometimes called "foul meadow grass."

In response to questions, the professor gave directions for the care of milk before and during delivery, substantially as in previous lectures. He also gave in detail his theory of butter making, as elsewhere described in these reports, and explained how it is that spores of putrefaction pass from the stagnant water drank by the cow into her blood, and appear in her milk and its products.

BROWN HILL, *June 28.*

WILLIAM PORTER called to order, and nominated S. A. Farrington as chairman.

Professor Arnold opened his remarks by saying: We are pressed between the upper and the nether millstone.

The unjust discrimination in freights favors the West at our expense. They get their cheese transported to the sea-board for less than cost, while we have to pay the deficiency.

The great and fertile expanse of the West gets her goods shipped to Liverpool, at less cost than New York State or Pennsylvania.

The West is a great country, and does things on a great scale. She is now doing in dairy products what she has for many years been doing in grain and beef cattle.

Whatever she undertakes, she goes into on a large scale, and becomes almost at once a serious competitor with the East. Cheap lands and abundant enterprise enables her to crowd us closely. We have a further competition against us in close proximity to England, where we have to find a market for our goods.

Holland is driving our cheese out of the English markets, while laboring under the disadvantages of land worth three to five times as much per acre as ours.

We have to compete, also, with English manufacture. English soil, as you well know, is immensely costly. These are competitions in cheese. Denmark and Sweden are our successful competitors in butter. They compete with us, not by making a cheap article, but by making a better article than we do.

Why can we not make as good butter as they do in Denmark?

Your soil is fine and I believe the milk produced here, some of it is as good as any that can be produced in Denmark or Holland. But they have always an eye to breeds of cattle and keep cows that are best adapted to the dairy business. While they are careful of breeds, they are no less careful in feeding their cows. They are high feeders, using an abundance of succulent food, and will not allow their cows to run on dry, short feed, and exposed to various discomforts.

Can we not avail ourselves of the benefits of skillful care in feed as well as the dairymen of Europe? An increasing number of Holland cattle are being imported into New York State and Canada, and I am surprised to see so little effort in this direction in Pennsylvania.

One reason why the West is successfully competing with us is that they are giving so much more attention to breeds adapted to dairying purposes.

You must pay more attention to this matter here or you will not keep even with other sections.

Many men seem to think milk right from the cow is about the best material for cheese making. This is a serious error. New milk right from the cow is as unfit for making fine cheese as green fruit is for sauce. It contains too much animal odor and in an immature state. Cheese made from such milk is soft, lacking in body, inclines to be porous, and has a sweetish, unpleasant flavor. Fine cheese can only be made where at least a portion of the milk has had time to mature. If the night's milk and morning's milk be made up separately in the morning, the cheese from the night's milk will be fine, but that from the new milk will be poor. Milk that has been hauled five or six miles will make better cheese than that produced close by the factory, if only the cans be well ventilated.

English Stilton and French Brie cheese are made of milk with an extra portion of cream added.

Excessively hot weather causes a change in the character of the milk. The cow becomes feverish, and the albumen in her blood is not changed into casein, as it is when her system is at a normal heat. Such milk smells "cowey" and feverish, and is wanting in cheese producing properties.

What is the reason that cheese supposed to be fine when made, sometimes begins to leak after it has become two or three weeks old?

The whey was not sufficiently expelled, and the curd was not matured properly. Heat expels the whey. Now, if a curd be cooled down before the whey escapes, its escape is checked and it is carried into the cheese, and must either evaporate or leak away.

Stickiness in cheese, a disposition to stick to the back of the tryer, is the result also of the same cause. The remedy is to expel the whey more perfectly before pressing.

Fouls in cattle is caused by an animalcula which burrows between the sections of the hoof and produces an irritation. It is similar to hoof rot in sheep, though the parasite is not the same in both. One remedy is to draw a rope back and forth between the hoofs, though this is a harsh remedy and not always effectual. Oil of cinnamon dropped into the parts is the best remedy I have found, and is easily applied. The disease is more common in wet weather or wet pastures, than in dry.

English cheddar cheese, selling in Liverpool at twelve to twenty shillings per hundred weight above American cheese, is no doubt intrinsically worth that much more than ours as a nutritious article of food.

This lecture closed the first part of the course. All the meetings, without exception, have been well attended, and, judging from appearances, very satisfactory to the patrons.

Professor Arnold's days have been given to cheese makers, and the instruction that has been given and rendered practicable over the cheese vat, has been highly appreciated by the cheese makers, who are thus enabled to fully understand what would be but imperfectly comprehended in the discussions of a dairy convention. The importance of close and intelligent observation of the various phenomena that happen in the manipulation of curds is thus impressed upon them, and they have learned how to better estimate the value of one who never tires of investigating little causes.

H. & C. FACTORY, *July 11.*

Professor ARNOLD remarked that the first thing he did on entering a factory was to take a survey of the premises to see if the necessary equipments were provided, and if the sanitary arrangements were what they should be.

Judging from a distant view of your factory one would expect to find these requirements all complete; but what was my surprise on entering the building to perceive an unpleasant odor of stagnant slops. On further examination I discovered an abandoned well partly filled with water and the drainings of the establishment, perfectly sickening to the sight, but still worse to the smell. Such things ought not to be. Persons who work amid such a stench of decaying matter and stagnant water are liable, any day, to be stricken with typhoid fever or other disease. The fumes of these cess pools are taken up and absorbed by the milk, the germs of decay are carried into the cheese, and the product is rendered unsuitable for human food. This is a matter that calls for your immediate attention and an immediate renovation.

With very little pains your factory can be rendered perfectly sweet and wholesome. The facilities for drainage are ample, if you give it the attention the case demands.

On examination of the milk, as received, I found some of it in fine order, but many cans gave off an intense animal odor, indicating neglect of the matter of aeration. One mess was distinctly sour.

The use of such milk insures cheese of bad flavor and quality.

Buyers call it off flavor, and it is a good way off from the right flavor.

I objected to the mixing of cold and warm milk in the cans, and one patron said he could not see why the milk might not as well be mixed at home as at the factory.

"There are none so blind as those who will not see."

There is a very great difference. In the first place, by keeping your milkings separate you may get rid of very much of the animal odor, which will the more readily pass off in the air. Besides this, if the odor is pent up and confined in the can, as it will be if the morning's milk is put into the same can with the night's milk, there is a rapid increase of the odor of the milk until it is delivered and emptied into the open vat. Then, when the heat is applied, the odor is increased still further, and is liable to develop into a floating curd, or something akin to it.

Just now, during this hot weather, your cheese-makers are experiencing a great deal of inconvenience in this respect, and you will suffer the penalty for your neglect in the price your product will bring in the market.

Breeds of Cows.

It is one of the facts that recommend the use of thorough-bred stock to produce grades, that the cross seems almost uniformly to produce better milking qualities than either of the ancestors possessed. The best qualities of both parents is transmitted and intensified in the progeny.

Holsteins have a longer line of pedigree than the Ayrshires or Short-Horns. The Holsteins date back some four hundred or five hundred years, while the Short-Horns date back only about two hundred years, and, in fact, are thought to have sprung from the Holsteins originally. Ayshires date back about one hundred years.

Holsteins are not properly Holstein, but Dutch cattle.

A herd in Oneida county averaged ten thousand pounds of milk last year, while the old cow of the dairy gave twelve thousand pounds. She is a cow weighing something over one thousand five hundred pounds.

Fresh Feed

Is easily digestive, but when it gets old and more solid and woody, it becomes less easy of digestion. When I fed raw potatoes to swine in the winter, I found the poor swine could barely digest enough to keep them alive, and they did not grow a bit; but when I boiled the potatoes, digestion became more easy, and the pigs flourished finely, and so it is with cows. If you want the best results, you must provide food adapted to their wants. It will pay, if you have nothing more economical to feed, to go into your corn field, and cut your growing corn, and feed liberally of it.

Cutting Hay Early.

There is a tremendous loss to dairymen from cutting late and matured grass for hay.

I have tried experiments with early cut and late cut hay, and found a discrepancy in yield of milk. Then I fed meal to make up the deficiency, and it took fifty-two cents worth of corn meal a week to bring up the mess again. Late cut hay is just like the raw potatoes for the pig.

We used to expect the cows to get sharp on the hips as spring advanced. Now, those who feed early cut hay find no trouble in keeping their cows in flesh and even in accumulating flesh during the winter.

It is profitable to feed cows a peck of roots a day towards spring, and the effects will last all through the season. The roots cleanse the system, carrying off the impurities and bringing the animal up to a high state of health, which is favorable to the production of a fine quality of milk.

A great loss is sustained in winter feeding by not protecting cows against cold weather.

I had ten cows in a warm stable and ten in a cold one, at the same time, and found that the former throve upon two thirds the amount of fodder consumed by the latter ten who did not thrive.

It was once thought that any kind of a building that had a roof on it and a few boards nailed on about its sides was good enough protection for cows.

The first really warm barn built in Herkimer county, was built by Harvey Farrington, (and the mason work was done by Captain Carpenter of Conneautville.)

Mr. Farrington made a careful estimate of the saving in fodder in his dairy after building this barn. His estimate was that if every dairyman in Herkimer county were to provide like protection for his cows, the saving of fodder in five years would be sufficient to build a new school-house in every school district and a church in every village in the county.

Clover hay, when well cured, makes excellent feed. It must, however, be cut while it is in its early blossom or it will become woody and relatively poor. Clover pasture, however, will not make as good milk as timothy and June grass. The curing of clover seems to free it of its objectional qualities and flavors, so that it will make sweeet flavored milk.

You can, with a little well-directed effort, double the profits from your dairies. If you would do this, you must surely give more attention to the feed and care of your cows.

Rules of the Elgin Condensed Milk Factory.

If it were possible for cheese factories to lay down and enforce such strict rules as are enforced at the Borden condensed milk factory, at Elgin, you would be astonished at the results. But this cannot be done in the nature of the business.

There is too much competition between factories to admit of enforcing such rules; and even if the factories should all combine to do it, others would be built, and would take the milk, without restriction. These would be largely patronized, because dairymen know so little what is for their best interests.

The rules of the Borden factory require that no stagnant pools of impure water shall be permitted where the cows can have access to it. They must not be allowed to drink any but fresh running or pure well water.

No food shall be given them but that which is approved as good, sweet, and wholesome; and of such, there shall be a liberal supply given.

The milk of no sick or lame cow shall be used, or from one that is feverish or has garget.

No milk from any cow shall be used till the calf is at least ten days old. And a man is placed at the head of the establishment who knows enough to detect poor or tainted milk, and makes it his business to enforce these rules. Dairymen submit to them, too, because, by so doing, they secure good prices for their milk, and because a condensing factory costs so much money, that there is no danger of competition, as is the case among cheese factories.

The penalty for violation of these rules is expulsion for all time from the privileges of the factory.

Patrons soon learn, therefore, that it is best for their interests to be watchful, and give heed to the voice of science and experience.

The question of animal odor is coming to be pretty well understood, not only by cheese makers, but by patrons. You have probably all smelled the odors from your cans—enough to be pretty well convinced that animal odor is a reality.

The longer the interval between milking, the poorer will be the quality of milk. By milking very early in the morning, and very late at night, the night's milk will be poor and the morning's milk much richer. Neither will you get as much milk in this way as by milking at equal intervals.

Milk sometimes coagulates while sweet. Such milk may be made into cheese without the use of rennet at all.

This condition of milk results from a feverish condition of the cow, to an extent sufficient to throw into the milk enough of the coagulating properties of the rennet nature to curdle it.

This is, of course, not a normal condition of the cow, though she is not necessarily actually diseased. While I cannot say that such milk is to be desired, it is not poisonous, like tainted milk.

Fastening Cows in the Stable.

Cows are more comfortable tied with a rope than in stanchions, though the latter is so much more convenient, that it is most generally approved.

The very best fastening I have seen was invented by Professor E. W. Stewart. He set posts about three feet six inches apart, between which the cow is to stand, the posts being on opposite sides of her neck. A staple, extending up and down about a foot, is driven into the side of each post, next the cow, and a chain extends from one staple to the other, under the cow's neck. In the middle of the chain is a ring, to which the cow is fastened by a strap or rope, which passes round the neck. The cow is thus left perfectly free to move her head, as the chain slides up or down in the staples, and she may turn enough to lick her sides, step forward, or back, or sidewise enough to be comfortable, while she cannot possibly gouge her neighbor, nor be gouged by her. This fastening is recommended to dairymen, as preferable to any other of which I know.

Watson's Run, *June 23.*

In all articles of production we should have an eye to the demands of the market. Supply and demand must govern us in production, if we would attain satisfactory results. At the present time we are apparently producing rather more butter and cheese than is required to meet the needs of consumers. The great trouble, however, is, we make too much inferior goods and too little that is really first class.

We are producing about three times as much cheese as our people will consume, and are compelled to send the surplus all to England. We need a more extensive outlet for our surplus. If we had the empire of Brazil, for a market for instance, we would be better off in this regard, but Brazilians have not become a cheese eating people.

Skim Cheese.

The great pity is, we do not make an article that suits the taste of our own people, neither does it meet the highest demands of the English consumer. It is a great misfortune that we persist in taking away from our cheese the element of all others most essential to its perfection. Skim cheese, made on our plan, is not as digestible as whole milk cheese. Yet some of the best cheese in the world is skim cheese, and sells now in New York at seventy cents per pound, while our best full cream cheese retails at fifteen cents. Two of the prize cheese at the World's Fair at Vienna, were half skims. I have seen good judges err in mistaking a skim for a whole milk cheese, but then the skim was made with the utmost skill. As generally made, skim cheese is totally unfit for human food, as much so as raw potatoes. I have found by experiment that common skim cheese, a year old, cannot be digested.

Many cheese makers are converting their whole milk into cheese of the nature of skims. I have found some of this kind in this county, though I am pleased to say that taking the acid method as a standard, most of that I have seen is finely made.

The town of Fairfield, in Herkimer county, has two factories that have given to that town and county a world-wide reputation for excellence. These cheese are ordered by English dealers direct from the factories, solely on that reputation; but alas, not all of Herkimer county's cheese is of that character. I have often been ashamed of my native county of Herkimer, for it is a fact that I find in Crawford county, in Wisconsin, and elsewhere, much cheese that is equal to her best, and that far excels her average make.

Good goods can not be made from poor stock. Good cloth can not be made from rotten fiber, nor good cheese from poor decayed milk.

Butter Oils.

We often know least about those things with which we are most familiar. We don't stop to think why it is that our hand moves at our will, or why and how fuel is consumed by fire, and converted into gases and ashes. So in regard to milk. We are so well acquainted with it, that we know very little about it.

I have studied milk for twenty-five years, and the more I study the more I find that I do not understand, and that seems almost past finding out.

If we place a sample of milk under a chemist's retort and apply a slight degree of heat, it will throw off one of its elements, water. Raise the heat a little higher, and another element escapes which we may call oil No. 1. Take that away, and heat a little higher, and we get oil No. 2, and so on till we have extracted the different oils that exist in the cream. There are still three non-volatile oils left, viz: stearine, oleane, and palmatine, which was formely called margarine. These volatile oils are convertable one into another by the various changes that the milk, cream, or butter, or cheese undergoes.

The lightest or most volatile and first to escape is animal odor. The nature of animal odor is such that it tends to produce rapid de composition of cheese and butter. All the other oils, however, are very valuable aids to digestion. They have much of the nature of cod liver oil and some of them are more beneficial to health than cod liver oil.

Now in cheese making we want at the outset to get rid of animal odor, but we want to save all the other oils to aid in curing the cheese and rendering it palatable and digestible.

When we skim the milk we deprive it of these aids to digestion. If we use an excess of acid, we cut them out, and to quite an extent, produce the same effect. As I said before, we want pure milk to secure good cheese.

How is milk injured by the propagation of animal odor? I answer, by careless or improper feeding, by abusive treatment of the cow, chasing her with dogs or in any way frightening her to render her nervous and feverish. Then you take this milk in close unventilated cans, and the agitation by the way, multiplies it. If you will at once divest your milk of animal odor by pouring, stirring, or any free ventilation, then the agitation of hauling on the road to the factory is no detriment to it, but an actual advantage for cheese making purposes; but if the animal odor be kept shut up closely in the can, the agitation will greatly intensify its evil effects.

Albuminoids.

Albuminoids exist in the curdy properties of milk. In the blood, before it is converted into milk, they exist as pure albumen, which is much like the white of an egg, in fact, the white of an egg is nearly pure albumen.

Albuminoids coagulated by rennet become curd. In the uncurdled milk they are called caseine. Albumen will not coagulate by rennet, but remains in the whey, and may be coagulated by heating the whey to the scalding point.

About six sevenths of the albuminoids in a healthy cow become caseine, and one seventh remains albumen. This goes to the hogs in the whey, and constitutes its value as food for hogs. Now, if a cow be over driven, or frightened, or beaten, she will fail to convert albumen into caseine, and there is a loss in yield of curd. So a chemist can tell by determining the amount of unconverted albumen in her milk, whether a cow is in normal health or in a feverish condition.

I once fed my cows upon some very poor hay that had been damaged by rain, and when I changed from that to well cured green cut hay my cheese product was increased twenty per cent.

When rennet is applied to milk the larger portion of the caseine is coagulated quickly, the remainder but slowly. What is termed "white whey," is merely an excess of uncoagulated caseine in the whey; it is not cream, as many suppose.

Every abuse of a cow tends to change the character of her milk, and it is possible, and not unfrequently is the case, that the effect of abusive treatment is to render the milk poison and destructive to human life, especially when given to young children.

Milk Production.

Milk production is the effect of a peculiar stimulation of the lacteal glands by maternity, and is designed by nature to provide for the wants of the young so long as they require it. Still the flow of milk is largely under our control as the cow is brought under a close state of domestication. In her naturally wild condition, the flow of milk is comparatively small, and the udder small, but by careful breeding and selection, resulting from domestication, the udder and other lacteal organs are developed, and the flow of milk largely increased.

Early in the season, cows get abundant supplies of succulent food to meet the demand of the milk producing organs. By and by, as the food becomes short, dry, and tough and woody, there is a shrinkage of milk. The lapse of time since maternity tends also in the same direction.

Now, if from these or any other causes the flow of milk is diminished for a length of time, the organs become shrunken, and their activity is diminished, and ordinarily, they cannot be restored to their former action till another maternity occurs.

This shows the great importance of using every means to keep up the full flow of milk right through the season. This can be done by providing plenty of the right kind of food for the cow, and supplying all her wants so that she is comfortable and quiet. Good water, and plenty, is as essential as good food.

Cows should not be allowed to get very thirsty and then gorge themselves with water, but water should be convenient of access.

Honorable Harris Lewis is able to keep up the yield of milk from his cows through the season to very nearly the highest point, by strict attention to food and water. But Mr. Lewis is specially favored with soil that produces the finest and sweetest grasses throughout the season. Not every dairyman is so favored, and such as are not should resort to sowed corn, an excellent milk producing food, with clover or millet, which are flesh producing, and hus supply the full needs of the cow.

Mr. Israel Bois, of Illinois, has, by like care, secured the remarkable yield of three hundred and fourteen and one half pounds of butter per head from his dairy of forty cows; but no man can obtain these great yields except by great skill and care in selecting and feeding.

Prevent unnecessary shrinkage, close up this avenue of loss, and dairying will pay even at low prices.

Grass is in its best stage while quite green, but not so with corn, which is at its best when in blossom. It must reach a stage near maturity to be worth much as food. It must also be sown wide enough apart to admit light and air, and so as to set freely for ears. Yet it must be cut before the nutriment has passed into the ear. Millet and Hungarian grass also should be cut while in blossom and before the straw becomes woody.

The Cheddar process of cheese making is based upon the well founded principle, that early drawing of the whey takes away from the curd, to a large extent, the taints and destructive influences that develop during the process of making.

My plan does not differ materially from the Cheddar process, except that I heat the milk before coagulation to blood heat instead of heating the curd as is the usual custom, and I draw the whey even earlier than they.

It is not true that I have gone back to the old practice of putting the curd to press sweet, making what has been known as sweet curd cheese. I merely withdraw the whey and so much of the acid as it contains, thereby relieving the curd of its toughening and injurious effects.

Skillful cheese makers can work the cream all into cheese, and the rising of cream on the whey vat is not necessary, but an evidence of a fault in making. I say we can, in America, make just as good cheese as the Cheddar or any English cheese.

Good digestible cheese may be made of milk partly skimmed, but with a like degree of skill a far better quality would result from the same milk unskimmed.

The practice of delivering milk but once a day is not objectionable, but rather advantageous, but only where the night's and morning's messes are kept and carried in separate cans. The evils largely arise from the mixing of the warm and cold milk, which intensifies the action of animal odor, and injures the quality of the cheese past all remedy.

RUNDLETOWN, *July 12, 1878.*

I have so little intimation as to what you most desire to have discussed, that I fear I may not adapt myself to your wants. In traveling through your county, I am happy to state that you have a county well adapted to your business. Your soil seems to be well adapted to the retention of moisture. You ought to give your calling more exclusive attention. You will never realize the highest benefits of this natural adaptation of soil till you shall center your thoughts and efforts upon the dairy.

The West is meeting with marked success, chiefly because of their giving to the business close care and attention.

So long as your energies are divided between the matters of horse raising, sheep raising, and steer raising, you will not meet with complete success as dairymen.

Of the eighty patrons whose names are on your factory books, the largest dairy is about forty cows, and not another of nearly that number. In my native town in Herkimer county, there are one hundred dairies, of forty cows and upwards each. One factory, with sixteen patrons, is making twenty-eight cheeses daily. There each dairyman gives his whole energy to the dairy, and hence the greater success.

Only twenty-five per cent. of the cheese received in New York is classed as fine. Seventy-five per cent. is therefore selling for less than it ought, and dairymen are losing this amount of shortage, which they cannot afford to do. Your profits are not so great that you can afford to take anything less than the highest price for your cheese.

We must improve the quality of our milk, and this must be done by improving the quality and increasing the quantity of the food of our dairies. I find in your factories some milk of the very finest quality, and some cheese as fine flavored as I have seen anywhere.

This is an indication that at least some of your patrons are taking good care of their cows, summer and winter. The feeding of grain and roots, and attending to the comfort of cows through the winter and spring, puts them in condition for the production of rich, high flavored milk, and in paying quantities.

Such milk can not be produced from half-starved cows, poor, bony, and weak. The milk of such cows is not adapted to profitable use either for cheese or butter.

If you would get large returns from your cows feed them grain all the time, especially when they have not plenty of fresh growing pasture of nutritious grasses.

If you clear your pasture of every tree that can produce shade, you have begun to do a bad business with your dairy. In the absence of trees, give the cows an artificial shade. Too much sun heat produces tainted milk, and tainted milk means feverish milk, and this means poor cheese, I don't care who the maker may be.

Your cows have now plenty of feed, and good feed, but the heat of the season, with other unfavorable conditions. taint your milk. Look to the causes of these troubles, and join efforts with your cheese maker to secure a victory over them.

The careful straining of milk must not be neglected.

Milk is often rejected at the factory when it is not sour, but is tainted, which is often much worse than sourness.

Patrons often fail to appreciate this fact, but if you will give the attention to the matter that your cheese maker is obliged to do, you will soon see it in a truer light than you now do.

Milk of itself does not go to destruction. It is some external influence that causes it to sour. The germs of destruction come chiefly from the air. Elements of putrification float in the air, and being deposited upon fresh meat or new milk, destroy them. By boiling milk so as to destroy these germs, and sealing it closely so as to prevent the introduction of more, it may be kept for months.

I often find cheese offered in competition for prizes that has been ruined in flavor by carrion taints, which have been inhaled with the breath of the cow. This comes of leaving dead carcasses to go to decay in your pastures uncovered.

I have seen a prominent dairyman, in Herkimer county, aerating his milk by causing it to fall some distance through the air, which is an excellent idea; but, unfortunately, in his case the breezes swept over a manure heap and from his stable directly upon these little falling streams of milk, so he was really depositing in his milk ten times as many germs of destruction as he was taking from it by the process of aeration. The fact must be emphasized that to render aeration of milk advantageous, the atmosphere must be pure and sweet.

We cool milk simply to retard decomposition, and yet it is a curious fact that when milk has been cooled to a low temperature, if its temperature be raised again it will not keep as long as it would if it had not been cooled. For this reason, as well as for others, you should never carry your night's and morning's milk in the same can.

The relative apparent richness of cheese is dependent, not so much upon the butter that it may contain as upon the soluble and easily digested condition of the casein. When the casein breaks down between the thumb and finger smoothly, having a soft rich feel, it is rich, whether it have much or little butter in its composition. It is seldom, however, that skim cheese presents this highly favorable feature.

Daily Pic-Nic at Spring.

The special lecture of Professor Arnold, appointed at Spring, was held on Saturday, July 13, in the open air.

A pic-nic was arranged under the auspices of the Spring Farmers' Club, which gives indication of being a live institution.

Desirous of promoting the dairy interest, and rendering the visit of the professor more profitable, as well as enjoyable, a general invitation was extended to all friends of the dairy to assemble in a pleasant little grove, near the stock farm of Powell Brothers.

The officers of the Dairymen's Association and Board of Trade were well represented, by special invitation.

A moderate change of weather from hot and showery to freshening breezes and clearing sky, bespoke a pleasant time for those present, but also forbade the attendance of many farmers, who were reminded that it was the last day of the week, and their bleaching hay must be put up or lost.

Bountiful provision of the good things for the inner man was made, and after an enjoyable repast, the "house" was called to order by President OLIVER, of the club, who placed Mr. A. M. Fuller in the chair as presiding officer.

The quartette club rendered an appropriate song, and prayer was offered by Reverend C. M. COBERN.

Mr. FULLER spoke briefly, as follows:

I greet you to-day as the largest gathering that has favored our lecturer thus far in this county. I greet you as friends, interested in the welfare of the people and in the success of one of America's leading industries.

The seeds that have been and are being sown must spring forth to bless you in the future. You are engaged in an industry that, while it calls forth your best energies, promises to give you as good a return for your labor as any in which you could engage. Sheep husbandry is profitable chiefly because it is kept within reasonable limits, so that not only the wool but mutton finds a ready market. Let sheep husbandry become as general as dairying, and mutton would be a drug in the market, and the business become unprofitable.

By giving due attention to the breeding and selection of stock adapted to your purposes, and studying how to adapt your feed and care to the one end, and by giving proper care to your milk at the dairy, matters upon which you are now receiving the very best instruction obtainable, your labors shall not be in vain, but you shall rejoice in happiness and plenty.

The cheese makers and salesmen of this section are, we believe, fully up to the standard of any other section, in skill, intelligence, and progressiveness. They have long been awake to the demands of their calling. The rank and file of the dairy, however, the patrons of our factories, need to be aroused to their peculiar duties and to drink of the spirit of progress. This is the object of this course of lectures, and from what I have seen and what I see before me to-day, I believe the effort gives hopeful promise of success.

The factory system has its faults, but it has, also, its advantages over any other plan yet devised, and with the modifications and improvements that will come from experience, it must be the system of the future. No other system of agriculture ever contemplated such constant and persistent efforts to promote the general good by the spread of general intelligence and special instruction. One of the worst evils of the system grows out of the unwise competition of factories to secure patronage. The buying, or as it is sometimes called, stealing of patrons, is fruitful of the worst results. In this matter, patrons and factorymen are both at fault, but chiefly the factorymen. You must rise to a higher plane of business honor before you can obtain satisfaction in your business.

Patrons must refuse to be bought or sold. Support your home industries is a wise motto, and if there be some faults at your home factory strive to remedy those faults, but patronize your own home factory, and thus give the factory business a character of permanency to which it has never yet attained. I should be sorry to see any combination of factories to regulate the evils that arise at the dairy. Far better that patrons should learn what their duties and interests are, and then, at your annual patrons' meetings, enact such rules for the care of cows, and care and delivery of milk, as shall remove those troubles that now harass the life and baffle the skill of your cheese makers.

I desire to call your attention to the principles and objects of dairymen's associations and boards of trade.

These organizations have made the interest what it is to-day. They have spread intelligence in regard to manufacturing methods and market demands. They have taken the best of your products, and placed them before the world, and thus secured for you your present reputation.

Study their aims, principles, and workings, and you will see that they are your indispensable aids.

The markets of Little Falls and Utica control the markets of America. Their prices, governed by cable quotations, are telegraphed to every board of trade in the land, and every patron may, if he will, know just what his cheese is worth, so that salesmen are no longer at the mercy of the buyers. Every movement of these organizations is toward greater dissemination of knowledge among salesmen and patrons.

L. C. **MAGAW** made a very few remarks of congratulation to dairymen on the peculiar adaptation of their soil and climate to their business and the progress they are making in developing these facilities.

The next speaker was S. A. **FARRINGTON**, who began by praising the cow as the "mother-in-law of us all," and making an appeal for her better treatment. He would have dairymen learn to make a better use of their heads, and not rely so much upon muscular effort. They should assort their dairies so as to waste no feed upon poor cows, keeping none but the best, and keeping those so well that they should pay a sure profit. He would have private dairymen get better acquainted with each other, and with these organizations that are striving to aid them in their labors.

If we think we have learned all about our business, we soon find that we fall behind in the race and our progress is at an end.

When we cheese buyers find this class of conceited cheese makers we always find them grumbling and dissatisfied with everybody, and their patrons grumbling and dissatisfied also.

We must not rely too much upon our natural resources. Ohio is producing more product per acre than we, although Crawford county has a larger proportion of available productive soil than Ohio.

When nature fails to do for us all we could wish, we must set to the work and do for ourselves.

Nothing else will return to us so gratefully for all our pains and expense as our cows. We must protect them, feed them, care for them, and treat them well, and then we may expect satisfaction at the pail—and at the sale.

H. C. **GREENE** spoke briefly, for those who are endeavoring to improve the quality of stock by careful breeding.

Breeders are often looked upon as selfish men and not well appreciated. Real enterprise is not placed at its true value.

Life is a struggle, and he who has most of the combative spirit and can pull others down to keep himself at the top of the heap is admired as a success.

The pugilist who can knock down and drag out a half dozen of his fellows may go to Congress, while he who has brains and uses them for the good of his kind, remains in obscurity unappreciated.

Stock breeders are useful to others, if not to themselves, and it is to the interest of dairymen to sustain and encourage such as direct their efforts, especially to the improvement of dairy stock.

The following resolutions were then offered, and passed:

Resolved, That in the misfortunes that have overcome our valued friend, Mr. William Skelton, one of Craword county's successful breeders of dairy stock, we feel that we are to suffer a severe loss, and that in his reverses that gentleman has our cordial sympathy and our best wishes for his future prosperity.

Resolved, That in view of the danger that threatens our farms from the invasion of white daisies and Canada thistles, that are creeping into our soil and getting established there, we recommend farmers to make use of every available means to destroy these pests and prevent their multiplication, to wage a war of extermination against them, and we also recommend the enforcement of the law bearing upon this point with such farmers as neglect to use means to prevent these enroachments.

Professor Arnold was then introduced.

The microscope is used to magnify the vision of minute objects.

Professor Edison has now invented an instrument for magnifying the slightest sounds. By becoming an enthusiast in his studies he is able to make the sound of a moving fly seem like heavy thunder. These are the results of trying to learn all there is to know on a given subject.

The dairy is worthy of more careful study than it has yet received. It is worthy of more enthusiastic students, and this want will soon be supplied by scores of men who will devote their time to careful investigations of the hidden influences that control your operations and limit the success of the dairy.

Dairymen often ignore their real interests and duties in the care of milk, while they are very careful to claim the last drop of whey. They truly "save at the tap, but waste at the bung."

When I hear a dairyman complaining that dairying don't pay, I know that he is spilling at the bung by keeping poor cows and neglecting his business. He is forgetting his milk, *but is after his whey.*

A few years ago cotton was king. To-day grass is king, especially in the eyes of the dairymen. Grass is what the dairyman wants and what he must have the year round, either green or dry.

This he can have by giving proper care to the matter. When I see, as I now see, grass all about me going to ruin for purposes of milk production, becoming woody and rusty and sapless from over maturity, it convinces me that dairymen are not giving sufficient thought to the matter of grass. They are "spilling at the bung."

Mr. Hoxie, of Whitesboro, New York, who got twelve thousand pounds of milk from one cow, and ten thousand pounds each from his dairy, does not neglect to cut his grass when it is green and at its best.

It costs no more to keep good cows than poor ones, but on the other hand, by judicious feeding good cows will pay a profit on a large proportion of their feed, while the feed given to poor cows is all wasted or merely pays for the labor involved.

I am glad to see that, in this portion of Crawford county, you are waking up to the improvement of your stock.

When you have done your part in the improvement of your stock, the improvement of your soils and grasses, the saving of your hay, and the care of your milk at the dairy, then if you do not get a first class article of product, you will be more justifiable in finding fault with your cheese maker.

Milk may vary in weight from day to day, but only according to its relative temperature or age.

As milk cools off it parts with some moisture and with its carbonic acid gas, and condenses in bulk, so that a quart will weigh heavier than it would when warm.

Milk also expands with heat and contracts with cold more than water, and would thus vary in weight.

Pumpkins and apples are very good food for milch cows, if properly fed. Those who think apples are not good for cows have probably tried their experiments by their cows breaking into the orchard at night and gorging with apples, which would very likely "shrink their milk and sour on their stomach."

Soiling.

It does not pay to devote rich and high priced land to pasture purposes. Such soil will produce much more food and richly pay for the labor by soiling. You thus get large quantities of rich succulent food from a small area.

Sowed corn, clover, oats, rye, millet, orchard grass, and such like rapid growing crops are most used for this purpose.

At twenty-five dollars per acre you may afford to pasture your land, but at $100 to $200 per acre you cannot afford it.

Replenishing the Dairy.

If you have first-class cows to breed from, by all means raise your calves to replenish your dairy; but if your cows are not first-class, you had better buy calves, heifers, or cows of the best milking stock you can get. Never replenish with poor or medium stock at any price, however low. Every common to fair cow you put into your dairy will lose you money.

Watch your business closely, look out for the leaks at the bung, and you will secure prosperity and happiness.

The Farmers' Club evinced their appreciation of the objects of the lecture by bringing on to the ground for exhibition some fine specimens of thoroughbred stock of the various breeds. Alderney, Holstein, Devon and Short-Horn. The animals were splendid representatives of their respective families, and their presence greatly enchanced the interest of the occasion.

WARNER'S FACTORY, *July 15.*

Meeting called to order by William Warner. L. C. Magaw was chosen to preside. On taking the chair, Mr. MAGAW spoke briefly, (he never wearies an audience with lengthy or tedious remarks,) uttering words of encouragement to dairymen, approving every effort made to place their calling upon advanced ground.

A. M. FULLER occupied a few moments in reviving the history of the factory movement in this locality, and was followed by H. C. GREENE, who called attention to the fact that, heretofore, the efforts on behalf of the dairy interest have taken effect chiefly with factorymen and cheese makers; that these have been the supporters of the meetings of the association and board of trade, and have engaged in the discussions, and by the friction of thought thus produced, they have gone far ahead of the private dairymen in regard to special information on dairy matters.

This course of lectures is now brought to the very doors of dairymen, to give them, if they will but avail themselves of it, a rare chance to obtain a better knowledge of their business.

Professor ARNOLD opened his lecture by remarking: "It is true that very much of the progress that has been made in the dairy has resulted from friction of ideas and interchange of thought, by those engaged in the business of dairying.

Eternal vigilance is the price of success in this as well as all other branches of business.

No person ever did or ever will attain a great success in cheese or butter making, who isolates himself and refuses to associate with others in the business, and to observe how others are doing, as well as to study how to do himself.

As I stood at your factory to-day, and looked upon the hillsides that surround it, clothed, as they are, with fresh, green pasturage of white clover and other nutritious pasture grasses, I thought the pasturage was as fine as I had ever seen anywhere. The soil seems to be all that could be desired for dairy purposes, and there is, in nature, no reason why you should not stand at the head of your business. Your factory is most favorably located, with excellent drainage, and everything within and without is sweet and clean.

I remark this, because it has been so customary to locate factories upon low, wet ground, where drainage is difficult, while, of all manufactories, the cheese factory demands the most thorough drainage. Yours has it, and under the favorable conditions I have mentioned, your product should be perfect in flavor. I do not wish to condemn your cheese as bad, but it is not so good or so clean flavored as it ought to be. When I examined the milk, as it was delivered this morning, I found a sufficient explanation, and, without doubt, the real cause of bad flavor in your cheese.

The milk was tainted and damaged for lack of care at the dairy.

Much of the milk was, of course, all right, but many cans were bad. Some of the cream was curdled and broken into lumps. Such cream cannot be well worked into the cheese, and if it could, the cheese would be the worse for it, because the cream contains a large amount of the taint which would thus be carried into the cheese, making it worse and worse.

Now the fact that a large proportion of the milk at any factory is delivered in good order, proves that it might all be in as good order, if it could receive as good care.

When milk is put into the can, and left unstirred, the cream forms a dry, tough film on its surface, and this film prevents the escape of the animal odor, and before morning it becomes tainted.

If in the morning the morning's milk is put into the same can, the taint becomes intensified, and the milk still further damaged. Now this is a serious evil, and one for which you, and not your cheese maker, are responsible. It is an evil which results in loss also, not to him, but to you. Small streams soon form the river. These little evils, coming as they do from their sources at the dairy, and combined at the factory, the results become serious.

One of your patrons has been feeding whey to his cows. When I explained to him the effect of sour whey fed to milch cows, that it injured the quality of the milk, and warped the character of the factory product, he promptly replied, "That is the end of my feeding whey. I see it now, but I did not see it before." Now, if you will all be as teachable, and observe my directions about the care of milk, which you have, no doubt, already heard repeatedly from your cheese maker, you will save him from his sad experiences, and put money in your own pockets.

In working the curds to-day, we had to contend with taints that at first would only be detected, perhaps, by a cheese maker or an expert smeller; and yet, when we had heated the curd to blood heat, and held it there three or four hours, the taint was so developed into putrefaction, that as the lumps of curd were broken open, they were filled with gas holes. The curd was becoming spongy, and the cheese will be spongy and off flavor. Such cheese sells at a discount, and you suffer the loss.

One of the great leaks in the dairy is in the keeping of poor cows. One of your patrons is furnishing but ten pounds of milk a head per day. Now, if those who are getting twenty-five pounds per day can barely make a living by keeping a dairy, how, I would ask, can any man live by getting only ten pounds?

In setting milk for cream, the first consideration is a pure atmosphere, free from taints of any kind. An upper room is better than a cellar or basement, chiefly because the air is drier. The temperature of a cellar would be better if the air could be dry, and free from the smell of the ground. Ordinarily, however, a dry, well inclosed upper room is better than a cellar.

If the temperature be high, the milk must be set correspondingly shallow. At a depth of two inches cream will rise in a pretty warm room. If the temperature be low, say at 60°, the milk may be set twenty inches deep and yet the cream will rise.

Cream rises best while the temperature is falling. If the temperature be reduced very low, when it gets to a stand still the cream will stop rising, or rise but very slowly.

Ice should not be used in cream when churning, because the sudden change of temperature breaks the texture of the oil and injures its quality. Besides, much of the ice used is taken from ponds or pools where the water is more or less impure.

The germs of impurity being frozen are not destroyed, but dormant, and are ready to grow and multiply as soon as the ice melts.

Guernsey cows are the best breed known for butter, giving an extremely rich and fine flavored milk. Jerseys or Alderneys and Devons come next in order.

For cheese, the best breeds are grade Short-Horns, Ayrshires, and Holsteins. The Holsteins are rapidly growing in favor, particularly for milk selling purposes.

There is in their milk more albumen which will not coagulate into cheese than any other milk I have tested. For this reason it is specially adapted to use in villages and cities and for children. The albumen being in a state to be readily appropriated by the system.

Butter made from sweet cream when the milk has been scalded or heated to about 140° will keep longer than butter from sour cream that has not been thus heated, but if the milk has not been scalded, souring the cream tends to make the butter keep better and to give it more body.

One of the chief reasons why dairymen in this section are less successful than in the older sections, is in the fact that you do not make dairying an exclusive business.

It is well, of course, for you to raise grain for your own use, if your soil is adapted to it, but it is not well to mix up your farming, as many of you are doing.

When you undertake to keep a cow dairy, a horse dairy, and a sheep dairy on the same farm, you cannot give that thought to either that is necessary to successful farming.

If your farm will keep twenty-five cows, put twenty-five cows on it, and by good management you may increase its capacity so that you can add to the number. This will render your dairy the controlling interest of the farm, and call forth your best energies and direct them to a single branch of business instead of its being as now, only an incidental matter made subservient to other departments of the farm.

Your dairies are now costing you vastly more in labor, care and anxiety, than if they were made the leading or exclusive interest.

At the best, the farmer's life is one of distraction; he has to keep along with several things at the same time, and sometimes, if he be not a good manager, his affairs get badly mixed up; he will be plowing when he ought to be sowing, and hoeing while his hay and grain are pressing for the harvest. By so much as he can unify his business and bring his thought to bear upon a single line, simplifying the complexity of his calling, will he reduce the relative cost of his products in labor and care.

Dairying is a trade as much as any mechanical trade. It takes years of experience to render it successful and only those who apply to the business their chief thought and the best skill they can command, are reaping satisfactory results.

Professor Arnolds's Closing Lecture.

MR. PRESIDENT AND GENTLEMEN OF THE MEADVILLE BOARD OF TRADE: In executing the arrangement made with the president of the Pennsylvania State Dairymen's Association, I have, upon visiting each factory, taken notes more or less copious, and from these I have made up a general statement of the work performed, which, by request, I now present to this board. This request is willingly complied with, because it is believed that the summary called for will have a tendency to prevent errors of fact and misconceptions of the nature and effect of the enterprise, which are always so apt to follow in the wake of novel undertakings. I am glad there is a board of trade here to receive the report, and to take an interest in this matter. From my first acquaintance with dairymen's boards of trade, I have been favorably impressed with the necessity of their existence, and with the valuable service to dairymen they have rendered and are rendering in the commercial transactions connected with their interest. When the American Exchange, of New York city, at first called the Butter and Cheese Exchange, sprang into existence, I remember well how much its reports did for the producers. Their sales were then made in an isolated way at the farm, or the factory, in which the purchasers always had the advantage. Single individuals could not afford to obtain telegrams from the leading markets to which their goods must go. They could not even get reliable reports of the transactions which had occurred several days previous, though published in circulars and as general news, because the reports were without authority. Commission men saw their interest in reporting prices high to attract consignments. Buyers saw theirs in reporting low to depress the minds of salesmen, so as to give a margin for profitable purchases. Coming from *ex parte* interest, neither was reliable, and the unposted salesman never knew, when he made a consignment or a sale, whether he had done well or ill, till the slow arrival of published accounts of real transactions reached him two or three weeks afterwards. Dealers could afford to be posted up to the last moment, and would often take advantage of the seller—the seller of the dealer never. He was always behind in his knowledge of the market.

When, therefore, the exchange made an unbiased and prompt report of actual sales, it brought the sellers much nearer to the dealers, in the state of the market, than they had ever been before, and they acted with a better understanding and more safety. When dairymen's boards of trade, consisting chiefly of salesmen, came into vogue, and the interests of all were united, so that one telegram would answer for all, the expense could be easily borne by the organization, and the sellers were, at once, up "cheek by jowl," with the dealers. They are now no longer subject to the sharp bargains of better posted men, but are able to deal intelligently, and to command whatever their goods are worth.

I regard dairymen's boards of trade as the most efficient means of securing fair and equitable dealing, and as necessary and important factors in the prosperity of producers. Without them, dairy commerce would at once fall back to the blind and uncertain deal, which so often worked to the detriment of salesmen a few years ago.

In her dairymen's board of trade, Pennsylvania has been very fortunate. It is located in the heart of her cheese producing district, at a point easy of access by rail and by smooth highways, making attendance by distant parties convenient. Your organization is made up of both buyers and sellers, and it is an evidence of the reliability of the reports you receive, that these opposing parties both rely upon the same information, as the basis for their respective transactions. You are, also, fortunate in the services of a disinterested presiding officer, of acknowledged commercial ability—a circumstance which enters prominently into the value and efficiency of the board. Had you selected a dealer as president, he might have been suspected of leaning toward the interest of his class; and, if a salesman, of a bias toward his. These sources of difficulty are wiped out by the choice of an umpire who can have no bias toward either interest, and who, at the same time, serves you without reward. I hope this item, in a successful board of trade, is appreciated.

In viewing the country which has come within my range of travel, I have been forcibly struck with its adaptability to the business of dairying. It has a rich soil, retentive of moisture, and a remarkable aptitude for the growth of grass. Productive and permanent pastures and meadows are everywhere apparent. The surface is rolling, rather than hilly, and the climate temperate, and springs of pure water, so essential to successful milk production, are well supplied on all the slopes.

Of the herds which graze upon this beautiful country, I cannot speak so favorably. Little attention seems to have been given to the improvement of milking stock. Some excellent cows have been met with, and large yields of milk observed, but the great mass of milking animals seem to have been reared with little regard to milking capacity. But I must add, in this connection, that some enterprising individuals have made a creditable beginning toward the production of better milking stock, by the introduction of some fine imported animals, notably at Springboro' and Meadville.

Having made these remarks, bearing upon the general situation of Crawford and neighboring counties, in reference to the dairy, I will proceed to give an account, as full as time will permit, of what has been done under the so-called "new departure," toward the improvement of your dairy interest.

The labor laid out for me consisted in visiting factories during the day, for the purpose of giving instruction to factory men in the art of cheese making, by examples of manufacture, by responding to inquiries, and by making such explanations as might seem to be required, and in the evening, to give informal lectures to the patrons of the factories upon topics relating to milk production and dairy farming in general.

I have visited, up to date, thirty factories, and given instructions in twenty-three, spending a day in each, and short visits were made in seven as they were passed. It has been made a point to inspect the milk as it arrived, and to witness the entire process of manufacture. This has enabled me to make suggestions, in every factory, of more or less value, as circumstances required. Whenever there was opportunity, one or more vats of milk have been placed under my charge, and worked wholly under my direction, to illustrate or explain the various manipulations required in making desirable goods. In conducting these operations, the care and handling of milk, the preparation and use of rennet, the entire process of manufacturing and curing cheese, have been talked over with each factory man as the work went along, and the reasons for each step explained. This course has enabled me to impress, through both the mind and the eye, the instructions desired, and enabled the workmen for the most part to correct their own errors, if any they had, and to work with a better understanding in the future. Some difficulty has occasionally occurred in these examples of manufacture, from the fact that I could not always know or control all the circumstances, such as the quality and strength of rennet, the exact condition of the milk, nor the impediments which would occur from defective apparatus, and hence, in a few instances only approximations to desired results could be reached, but in most instances they have been successful and satisfactory.

It has been a leading object in these visits with the factory men to impress upon them, both by reason and the results in the curing room, the distinctive effects of acid and rennet in the manufacture of cheese. I have explained that the active agency in rennet is simply gastric juice steeped from the calf's stomach, and does all its work through its digestive action. By this action it curdles the milk, separates and expels the whey from the curd, and converts the curd into cheese. However much the fact may be obscured by mysterious and empyric modes of working, it is the digestive action of rennet upon milk which makes our cheese, and it is nothing else. Acid may curdle milk and separate whey, but it never converts curd into cheese. On the contrary, it counteracts and hinders the action of rennet in curing cheese, and injures its flavor, and digestibility, and keeping, and hence is not only not necessary, but is not desirable in the process of cheese making. Though it removes none of them, acid covers up some of the common defects of milk, and hence it has come into general use in factory cheese making, and is highly prized by many who know of no satisfactory way of making cheese without it.

Having demonstrated the truth of these statements beyond question, I have labored to impress them upon cheese makers, and introduced and explained methods by which the use of acid whey, heretofore deemed so essential, can be avoided, and a better and safer cheese made without it. It may interest no one else, but it will interest cheese makers of whom a large number are present, to explain briefly how this has been done. It is very simple and plain, as you will see, and requires less labor, and time, and skill, and no more milk, than when acid whey is used. The milk is set with rennet, the curd cut and worked until it is warmed to blood heat, the same as when acid is to be used. The whey is kept on and the heat is kept up, and the curd worked as usual till the great bulk of whey is expelled from the curd, and the curd has assumed considerable firmness. It is then allowed to settle to the bottom of the vat without any more working. Before it becomes either stale or sour, the whey is drawn off and the curd so packed in the vat, or sink, that the whey will drain away from it readily, and the whole so closely covered that the curd will remain as near blood heat as possible. In this situation it remains, the curd being turned occasionally, if need be, to keep all parts of it warm alike, till the whey is sufficiently expelled to give the curd the desired dryness and ripeness to secure a firm and solid texture to the cheese. The time for drawing the whey may be varied, but it should not be before the whey is pretty well separated and the curd becomes pretty hard, otherwise the whey will, from its being too abundant, form little pools within the curd, and sour and injure the cheese. On the other hand, it should not remain on so long as to become sour and stale, for these qualities will be impressed upon the curd and carried into the cheese to its detriment. If the milk is all right, the time for drawing the whey may be varied an hour or so, without material effect, but if the milk is faulty, it should be drawn as early as is safe to prevent the re-action of the faults upon the curd. What is most essential in the process is, that, after the whey is off, the curd should be kept warm till whey enough is expelled. If allowed to become cool, the separation of whey ceases and it remains in the curd to make the cheese soft and sharp, and in many ways undesirable. When sufficient moisture has been removed, the curd is ground to make it fine for taking salt evenly, and is salted and pressed the same as in any other method. The same guide for determining when a curd is ripe enough for the press, may be used in this way of handling curds, as in the old way of souring in whey—the hot iron.

There is this difference between the old and new mode in respect to the significance of the iron test. If the curd lies in whey till it spins, it will be ruined if not at once removed. If it spins by lying warm in the vat, and free from whey, it will not spoil should it lie another half hour. It will only hasten the time of curing. There is no minute work about this process. There is ample latitude for convenience in working. The work in one case goes on by souring, which is rapid and ruinous. In the other, by digestion which is steady and harmless, and is hastened or retarded only as it varies in temperature. The hot iron distinguishes between these two modes of action. The acid action is denoted by fine silky threads. The digestive or rennet action by longer and coarser threads, like those of toasted cheese, and indicate the progress of cheesing, which is a result always favorable and to be desired. The latter, once induced, always remains, and the test grows more distinct as the curd cures. The former, or acid test, disappears with the presence of sour whey, and usually ceases entirely in a few days after the curd is pressed.

Acid, I know, is generally believed to be the *sine qua non* without which good firm cheese cannot be made. It is believed to be the remedy for all defects. If our cheese is too soft so it will not stand up well in warm weather, if it is porous and weak, we are told to "put on more acid." It was but the other day I read this emphatic injunction from a commission house in New York. But what we want in such cases is not more acid, but less moisture. It is a *variation of moisture* that determines whether a cheese shall be soft and weak, or firm and enduring, and not acid. Putting on more acid is one means of expelling moisture, but it is not the best means. Acid lessens the flavor of cheese by cutting the delicate aromatic oils which are taken from the milk into the curd. The more acid we have the more of the oils are destroyed, and hence the less flavor and the more sour, chippy, and insipid is the cheese. The better way to expel moisture from curd is simply to keep it *warm* till enough is expelled to give the desired consistency—to keep it warm, not in a mass of stale whey, but in a warm and snugly covered vat, and this not after, but before salting.

Stale and acid whey would never have been employed to expel moisture from the curd if the fact had been duly appreciated that moisture separates from the curd as well out of whey as in it, if its temperature is the same. It is a part of my missionary labors among you to impress that important fact.

As there are other things to speak of, perhaps I am dwelling on this point too long. But before I pass to another topic I beg permission to say, that cheese made by this process of maturing curd out of whey instead of in it, have proved to possess superior merit. It is true they have not yet sold any higher than fine acid cheese, and this was to be expected, because it is yet in such small quantities, and so little known, that it has not been appreciated. But it is always sought for and sells at the top of the market, and, what is of some consequence in these times of bad milk and worse cheese, the factories which have adopted this course have had no rejections in their sales, nor bad cheese on their shelves, since becoming established in this way of manufacturing.

It is by far the best method of treating defective milk, of which the recent hot weather has developed an enormous amount. It is not claimed that it will make a perfect cheese out of bad milk, but, since the defects in milk are rapidly multiplied in warm whey, it is claimed that the early removal of the whey from the curd is the most effectual way of abating such defects When the milk is all right the cheese has a higher and more aromatic flavor, more quality, better keeping, and is less affected by heat and cold than acid cheese under the same circumstances. It is also more palatable, digestible, and healthful, and better suited to the tastes of our own people.

The English Cheddar cheese, which sells steadily for twelve to fifteen shillings sterling above our best, has essentially the same qualities, and is made but little different from the process I have been advising your factory men to adopt, and there is no good reason why, when this kind of cheese shall become more largely made, and better known and appreciated, it should not also command an advance in price.

I think over one half of the factories visited, sixteen or seventeen out of twenty-three, are now following this process, wholly or in part, with good results. Nothing, I am confident, would do more to elevate the reputation of Pennsylvania cheese than to have it adopted in all the factories.

Inasmuch as the milk or curd must at some time be heated to facilitate the action of rennet in expelling whey from the curd, it has latterly been a favorite plan with me to heat the milk to blood heat before applying the rennet, because it could be so much more rapidly, evenly, and safely heated than it could be after the curd has been formed. Under the circumstances common to most factories, this mode of heating has worked well, and shortened the time and labor in making. This plan has been suggested here, and experiments have been made, but so far they have not proved very satisfactory. It is the universal practice here to deliver but once a day, the evening's milk being retained on the farm during the night, and delivered with the milk of the following morning. The cream which rises during the night becomes more or less advanced, and the churning it receives by a ride of four, five, six, and sometimes seven miles, to reach the factory, changes it so much that when it is heated to ninety-eight degrees, it becomes so oily as to escape when the curd is cut, and makes the whey roily, indicating loss. The experiments I have made in setting at ninety to ninety-four degrees have been free from this objection, and have, in all respects, worked well. It is so desirable to avoid the danger of heating curd unevenly, and it saves so much labor and loss in working, it seems very desirable to do all the heating in the milk instead of the curd, that can be done safely. To this end I have advised factory men who have been setting low and desire to set higher, to raise the milk a degree or two at a time, and watch the results carefully, and stop at the highest degree which can be safely reached. Some who have set at ninety-eight degrees have found their cheese too hard and dry, but most have found them too soft.

These inequalities are not due to the degree of heating, but result from inexperience in working at an unusual heat, and would regulate themselves in time.

Preparation of Rennets.

A good deal of faulty management has been met with in the preservation and care of rennets, while preparing for use. Some have soaked in water and lost heavily from tainting, but more have, and are still, soaking in whey, to the detriment of their cheese, as I verily believe, but with less loss from tainting. I was once in the habit of using whey for soaking rennets, but long ago abandoned it as not so good as water. That feeding whey to cows injures the cheese made from their milk has long been settled by overwhelming testimony. In such instances but a very small part of the influence of the whey can reach the milk, the most of it being changed or lost in the process of digestion. If such a weak impression of whey will work a palpable injury, what must be expected when the whey itself is put directly into the milk by the quart, and sometimes by the pailful, and carried unavoidably into the cheese? Can there be a question as to the result? My advice has been, and still is, to use only water. If the weather is hot and there is danger of spoiling, soak in a weak brine two days, rubbing them well and often. Then salt this brine so it will keep, and put the rennets in a new brine to remain three days longer, rubbing them as before. By this time they have imparted their strength and may be thrown away and the two brines mixed and made strong enough to keep sweet till used up. The brine should be stirred every time before using. When the weather becomes cooler, they may, if desirable, be soaked longer. In this way water may be safely used at any time, and the bad influence of stale whey upon the cheese be avoided. The water, if not pure, should be boiled and cooled before using. Rennets that will not keep sweet with such treatment are too faulty to be used and had better be thrown away before soaking.

The Salt Question.

At almost every factory, the question, "What salt is best to use?" has been raised. To this I have answered, the purest. To determine purity, analysis is the best evidence. Appealing to this test, four brands met with in this section appear satisfactory—two American and two foreign. They are the American Dairy, F. F., Excelsior, F. F., the Ashton and Higgins. Besides these, two varieties of Michigan salt are in use here, one of which is quite faulty, being full of dust, which seems to be some compound of lime. The other has no fault which I can detect by inspection. It yields a clear and palatable brine, and I have not been able to discover any defects in the cheese where it has been used. I do not know anything of the analysis of this "Bay City" salt, but all the analyses of Michigan salt I have seen have been so faulty that it casts suspicion upon anything coming from that quarter, and I have advised factorymen to be cautious about using it.

Cheese Factories.

The factories of Pennsylvania are not very different from other factories in localities not long devoted to cheese-making.

They are generally plain structures, built of rough lumber, and without ornamentation, very few can boast of paint, or even planed siding. They are mostly well supplied with good water from springs adjacent to their sites, but, unfortunately, it sometimes happens that, to make a spring available, it has seemed necessary to set the building in such a depressed condition as to seriously interfere with drainage, and thus to occasion cess-pools of stagnant whey and wash from the make-room, to the discomfort of workmen, the injury of cheese, and, in a few cases, to the danger of health. A majority are located upon inclines which admit of efficient drainage. But, whether well or ill-drained, I have rarely failed to find the interior of the make-room, its floors, vats, and other apparatus, in a clean and tidy condition. The most objectionable feature found about the factories is the almost universal want of proper curing-rooms. Many of them are sided with nothing but rough boards, and not very snugly battened, with floors open above and below, and sides not tight, and are, generally, not so well cared for as the make-rooms. These defects in the curing-rooms are serious impediments to the progress of the cheese interest. When cheese is exposed to all the changes of the weather, the temperature of the curing-room running up and down with all the variations of the outside air, its curing is not only interfered with by chilling, but its flavor, by alternate heat and cold, becomes modified unfavorably, making it less desirable, and often affecting the price. Full cream cheese cures best at a temperature of about seventy degrees, and a curing-room should be made tight enough to maintain an approximation to that degree, regardless of outside temperature. This can best be done with good sound siding and glazed ceiling paper. Two coats of paper nailed on opposite sides of the studs and breaking joints on the studs, and the paper covered by good siding, which is separated from the paper by furring, which should cover the joints of the paper, will make cheap walls which keep out either heat or cold, and, with tight floors, will make rooms that will be so equable in temperature as to enable cheese cured in them to develop their best qualities.

Cheese.

In all the factories I have visited, whether for instructing or casually, I have been permitted everywhere to make full examinations of the stock of cheese. As a whole I am glad to say it has proved better than I had anticipated. More factories were holding goods which would sell at the top quotations than could be reasonably hoped for in a country which has not been engaged in manufacturing any longer than yours. It is a prominent item in the history of factory cheese making, that a good many years' experience are required to educate all the parties in interest, up to a standard requisite to produce the best results. The progress of Pennsylvania has been rapid, and her cheese making has risen to a prominence beyond its years, and assumed a position in which you may well feel a just pride.

Perfection belongs to no dairy district in the United States, if it does to any district in the world, and your State of course is not an exception.

The defective curing-rooms of which I have spoken have done material injury to a large share of your cheese. When the milk has come in faulty, as it is very sure to do in times of oppressive heat, the cheese feel the defects of the milk, and hence are easily warped by unfavorable influences. To expose cheese, especially that made by the acid method, derived from tainted milk, to a temperature of eighty to ninety degrees, as often occurs in our torrid season, is to put them at once on the high road to ruin. They, least of all, are suited to high and rapid curing, and at once get off flavor and proclaim to every dealer, if not to others, their bad ancestry and their unfortunate associations, and when they go to the city they are cast out of the society of common cheese, and are set aside as "rejections," to be paid for at reduced rates. In a curing-room whose temperature could be controlled, the most of such cheeses could have held on to their social position.

Leaky Cheese.

In June there was a difficulty which ran through a large number of factories, not only here, but I understand elsewhere, consisting in a tendency to leak whey in different stages of curing. I think a part of this may be charged to poor curing-rooms, but not wholly so. It is a custom with many makers to leave the make-vats uncovered while the milk is coagulating. In cool weather, in an open room, the top of the milk and curd will sometimes get cooled down from the top, two inches or more deep. This curd, in the after treatment, will never catch up in ripeness with the rest, and when it goes to press will contain an excess of whey. The contents of the uncovered vat, after the heating is done, will, also, drop down more in a cold open room than is desirable, making the separation of whey less complete, perhaps, than the maker is aware of. If such curd is put into a variable curing-room, it will go along well while the room is cool; but when the other extreme comes on, the extra whey will sour and separate from the curd, and leak out. In a room at 70°, the leakage would, probably, not have occurred, except in some extreme cases. Uniform temperature in making and curing, I am confident, would have prevented much, if not all, of this annoyance and loss, which has seemed to be peculiar to this season. It seems to have passed by now, and that kind of cheese has disappeared from the curing-rooms. It is a striking fact, which may be cited in this connection, that the cheese made after the manner I have advised, has been almost entirely free from this difficulty.

Milk.

The yield of milk has varied considerably since I first came into the State. It averaged about twenty-two pounds per day to the cow on my arrival; but has now fallen to about eighteen. This is a great shrinkage. It is not peculiar to this section; but is general, extending to all parts heard from. Cows must be expected to shrink as the season advances; but they have begun earlier this year than usual, owing, as I think, to the matured condition of the grass, it having, from age, become tough and woody. From this shrinkage the cows will not recover. It must remain, and the cows will consequently dry up earlier than usual. The extraordinary yield of milk in the early part of the season is likely to be followed by a smaller one in the latter part, giving a fair probability that prices will rise to correspond with the diminished product.

Patrons' Meetings.

The meetings of the patrons of factories have been successful beyond expectation. It has often been said, and with too much truth, that it is hard work to get agricultural people to attend agricultural meetings. It cannot be said of Pennsylvanians, at least in this part of the State.

With but two exceptions, one from rain and the other partly from heat and fatigue in the hay field, and partly, perhaps, from a want of interest, the meetings I have attended have been large and enthusiastic. I had the honor at these neighborhood meetings, to address some five thousand people upon topics relating to dairy farming, and have been gratified with the hearty receptions I have always had, and the lively interest and active part my hearers have taken in the proceedings, as evinced by their frequent questions and remarks.

The subjects discussed with most attention have been the care of milk; milking stock, how to rear, improve, and select; milk production, as it relates to feed and treatment; butter making; cheese making; dairy-rooms; farm buildings; the care of milking stock, &c., &c. I have prepared no addresses, and have spoken without notes. Our proceedings have been quite informal, and largely conversational. It has been made a point to learn from each meeting what topics were preferred, and to devote the time to these as directly and fully as possible. The intelligence which has been everywhere manifested could not fail to impress one very favorably with the progressive spirit of your agricultural public.

I had intended to give you a fuller account of the discussions and conduct of the meetings, but my remarks have already been protracted too long, and I must close with the remark that the matter presented has always been very fully appreciated, and many of the suggestions at once acted upon. I am constrained to say that in view of the unexpected attendance at the meetings and their very interesting character, and in view of the hearty coöperation of your cheese makers, and the readiness with which they have appreciated the improvements suggested to them, and the large extent to which improvements have already been made, this "new departure" you have had the enterprise to suggest, and the energy to carry out, has proved a success beyond my most sanguine expectations.

PENNSYLVANIA STATE DAIRYMEN'S BOARD OF TRADE.

Officers for 1878.

President—LEON C. MAGAW, Meadville.

Vice Presidents—JOHN COLE, Venango; IRA HALL, Randolph; THOMAS C. COCHRAN, Sheakleyville.

Secretary—N. B. HOFFORD, Meadville.

Treasurer—S. B. DICK, Meadville.

Revised Rules and Regulations Adopted May 14, 1878.

MEMBERSHIP FEES.

1. The payment to the treasurer of two dollars constitutes a membership to the Board of Trade for one year, with provision for assessing an additional three dollars, if it should become necessary, to defray expenses.

OFFICERS.

2. The officers shall consist of a President, three Vice Presidents, a Secretary, and Treasurer, who shall be elected by the Board.

DUTY OF THE PRESIDENT.

3. It shall be the duty of the President to procure telegrams, and any information deemed necessary for the board, and to issue tickets of membership.

DUTY OF THE SECRETARY.

4. It shall be the duty of the Secretary, as far as possible, to obtain and record all the transactions on the board each sale day. He shall also forward, by postal card, to absent members requesting it, the weekly market reports, and shall receive twenty-five dollars for his services.

PRIVILEGES OF THE BOARD.

5. Members only shall be entitled to the privilege of buying and selling on the board.

PRIVILEGES OF MEMBERS.

6. Every factory shall be held responsible for the acts on the board, of its authorized salesmen, any one of whom shall be admitted on presentation of the factory's ticket of membership. A buyer and his agent may be admitted on the same ticket. It shall be proper for a member of this board to be accompanied, when admitted to the sales room, by a neighbor or friend who is not interested in buying or selling, without additional charge; but it is understood that this is a matter of courtesy, and any violation of good faith will be deemed a breach of the rules of the board.

REGISTER.

7. There shall be a register and bulletin board arranged in a conspicuous place in the room, upon which will be posted all telegrams or reports for the information of members, and salesmen will consider it their duty as well as privilege to record upon said register any dairy products they may have for sale, or have sold, not already recorded.

ARBITRATION.

8. There shall be a board of arbitration constituted for the purpose of hearing, adjusting, and settling all differences which may arise from time to time between buyers and sellers, and it is an express understanding and agreement by and between such and all the members hereof, that such a settlement by such arbitration committee shall be final, and adhered to. Said board of arbitration shall be chosen and constituted as follows: In case of differences between two parties or interests, the said parties or interests shall each choose one member of the board, and the two members thus chosen shall select a third, and these three shall constitute a board of arbitration, and have appropriate jurisdiction.

BARGAINS.

9. All bargains made between members at the sales-room or elsewhere, verbally or otherwise, shall be considered binding, and to be lived up to and carried out by each of the parties thereto, and a failure of either party to perform his or their part thereof shall be considered sufficient cause for expulsion from said board and sales-room of the party so failing to perform.

SHORT WEIGHTS.

10. In view of avoiding contentions respecting short weights, it is agreed that when a discrepancy is found in the weights of cheese on arrival in market, if tested within one week after shipment, the certificate of the authorized weigher shall be considered a standard to settle by; but this rule shall not be construed to prevent special agreements between members.

Notice of such short weights shall be given to the salesmen within thirty days after shipment.

AMENDMENTS.

11. Amendments to these rules and regulations may be made at any regular meeting of the Board, by a majority vote, provided notice of the proposed amendment has been duly given.

Board meets regularly in Meadville, on Tuesdays, at half-past one, P. M., sharp, during the season.

This is an organization of dairymen and dealers in dairy produce to facilitate the sale of cheese and butter.

These boards of trade are an outgrowth of dairymen's associations, and have become a necessity in the progress of the dairy industry. By their instrumentality, the salesmen are informed of the conditions and demands of the markets, and may know the exact value of the goods they have for sale, as fully as the buyers. An important feature of this board is, that the first hour of each weekly session is devoted to discussions upon such questions as arise from time to time in the progress of the season and markets.

Questions regarding the modes of manufacture, the qualities and styles demanded by the markets, transportation, and the various points upon which success depends, are properly brought before the board, and, by exchange of views and information, a degree of intelligence is secured, otherwise unattainable.

The Board of Trade re-organized and put itself in working order for the season of 1878, on May 10.

The second meeting of the board opened with President Magaw in the chair, who announced the following committees:

On National Dairy Fair, to be held in New York, December 2, 1878—S. A. Farrington, J. G. Holman, and William Nash.

On revision of premium list for dairy products, at request of the Pennsylvania State Agricultural Society—H. C. Greene, T. C. Cochran, I. W. Allee.

Messrs. Fuller and Magaw, who had been appointed a committee on transportation, reported progress in negotiating with the officers of the Atlantic and Great Western railroad, and assured the board that the road was disposed to provide all reasonable facilities for the transportation of cheese and butter, and desired the board to name the days most desirable as special shipping days. The committee also advised any members that felt themselves in any way oppressed or inconvenienced by lack of suitable cars, by unnecessary delays in transportation, &c., to report promptly to the committee, who would present the facts before the proper officials, when they were assured these faults would be promptly remedied. The general superintendent was desirous to meet the wants of shippers, and asked to be informed as to such wants.

Messrs. Greene and Bigger, committee on revision of the rules of the board, reported a revised set of rules, and recommended that the Secretary be instructed to have printed, for distribution, two hundred copies of the same.

The reports of the several committees were accepted and adopted.

May 28.

Vice President COLE called to order, and Mr. WILLIAM NASH asked for information in regard to the interpretation of cable quotations, which was responded to by Mr. H. TERRY, who explained the various terms used to indicate Liverpool quotations and freight rates.

The disadvantage of shipping cheese too green and imperfectly cured was discussed, and shippers were advised to ship only cured cheese, and to take more pains in properly boxing and marking—to mark the weight of every cheese distinctly on its side, and not on the cover, as covers often get changed, and to shave the box so that the cover shall just rest on the face of the cheese.

The dealers deprecated the practice of boxing cheese so carelessly; that when they arrive in New York, the boxes are smashed in, and the cheese soiled, so as to frequently depreciate their sale.

Goods always sell best when attractive in appearance, and it pays to take pains in these matters. Shippers would many times be surprised to see the condition of their cheese on arrival at the docks. They would not recognize them as the nice, clean cheese they had on their shelves but a week before.

Mr. A. M. **FULLER** called the attention of the Board to the act of the Legislature, making an appropriation to the Pennsylvania Dairymen's Association, and the following resolution was offered and unanimously passed:

WHEREAS, Our State Legislature has so generously recognized the Pennsylvania State Dairymen's Association, representing the dairy interest of Pennsylvania, by an annual appropriation, securing the publication of its annual report; therefore,

Resolved, That we express our appreciation of the favors granted us, and tender to our representatives, Colonel O. O. Potter and Honorable S. H. Findley, a vote of thanks for their aid in securing to our sister organization so timely and valuable a recognition.

June 11.

Mr. A. M. **FULLER** announced that the executive committee of the Dairymen's Association had secured the services of H. C. Greene, to report the lectures of Professor Arnold, at the factories of Erie and Crawford counties.

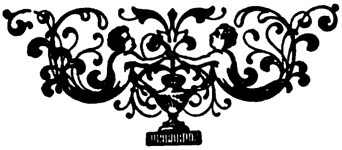
June 25.

Mr. Ash, freight agent for the Empire Line, desired to know whether the board preferred to ship in refrigerator cars or in ventilated cars. After a discussion of the merits and demerits of the two methods, it was decided that, while iced cars may be preferable for butter, they are not desirable for cheese, which is transported most safely in ventilated cars.

Table of Offerings and Prices at Meadville, for the Season of 1878, to November 1; also, for corresponding weeks of Preceding Seasons.

		Offerings—Boxes.	Prices.
May	28, 1878,	1,632,	8 c.@ 8¾c.
May	28, 1877,	847,	11 @11½
June	4, 1878,	1,062,	7 @ 7½
June	4, 1877,	1,237,	10 @10½
June	11, 1878,	1,603,	7 @ 7¾
June	11, 1877,	1,954,	10 @10½
June	11, 1876,	1,927,	8½ @ 8¾
June	11, 1875,	1,880,	10 @10¾
June	25, 1878,	1,500,	7 @ 8
June	25, 1877,	800,	8½ @ 9
July	2, 1878,	2,449,	7 @ 7½
July	2, 1877,	2,100,	8½ @ 8¾
July	9, 1878,	4,232,	7½ @ 7¾
July	9, 1877,	3,065,	8½ @ 9¼
July	9, 1876,	1,668,	8½ @ 9
July	16, 1878,	3,953,	7¼ @ 7½
July	16, 1877,	4,192,	9¾ @10
July	16, 1876,	1,100,	8 @ 8½
July	16, 1875,	4,644,	10 @11
July	23, 1878,	2,928,	7 @ 7¾
July	23, 1877,	1,110,	9½ @10

		Offerings—Boxes.	Prices.
July	23, 1876,	3,925,	8 @ 8¼
July	23, 1874,	9,505,	10¼ @10½
July	30, 1878,	4,123,	7 @ 8¼
July	30, 1877,	2,006,	8 @10
July	30, 1876,	2,415,	7¼ @ 8½
July	30, 1875,	1,766,	10 @10¾
August	13, 1878,	4,435,	7 @ 7½
August	13, 1877,	5,078,	9 @ 9¾
August	13, 1876,	1,400,	8 @ 8½
August	13, 1875,	3,965,	11 @11¼
August	27, 1878,	5,435,	7½ @ 8
August	27, 1877,	1,150,	10 @11
August	27, 1876,	2,200,	8 @ 8½
August	27, 1875,	4,000,	9 @10
September	3, 1878,	2,605,	7½ @ 8
September	3, 1877,	2,869,	11 @11½
September	3, 1876,	1,835,	10 @10½
September	3, 1875,	3,725,	9 @ 9½
September	10, 1878,	4,050,	7½ @ 8½
September	10, 1877,	5,161,	12 @12½
September	10, 1876,	1,525,	11 @11½
September	10, 1875,	5,000,	10 @10½
September	24, 1878,	10,600,	7½ @ 8½
September	24, 1877,	4,122,	12¼ @12½
September	24, 1876,	——	12 @12¼
September	24, 1875,	6,150,	11 @11½
October	1, 1878,	9,500,	7 @ 8½
October	1, 1877,	3,690,	12 @13
October	1, 1876,	1,560,	12 @13¼
October	1, 1875,	1,000,	11 @12
October	8, 1878,	7,170,	8¼ @ 8¾
October	8, 1877,	7,240,	12½ @13
October	8, 1876,	2,000,	11 @12½
October	8, 1875,	1,2792,	12¼ @13
October	15, 1878,	4,150,	8 @ 9
October	15, 1877,	5,865,	12½ @12
October	15, 1876,	8,595,	11 @12¾
October	22, 1878,	5,185,	8½ @ 9
October	22, 1877,	13,839,	13 @13½



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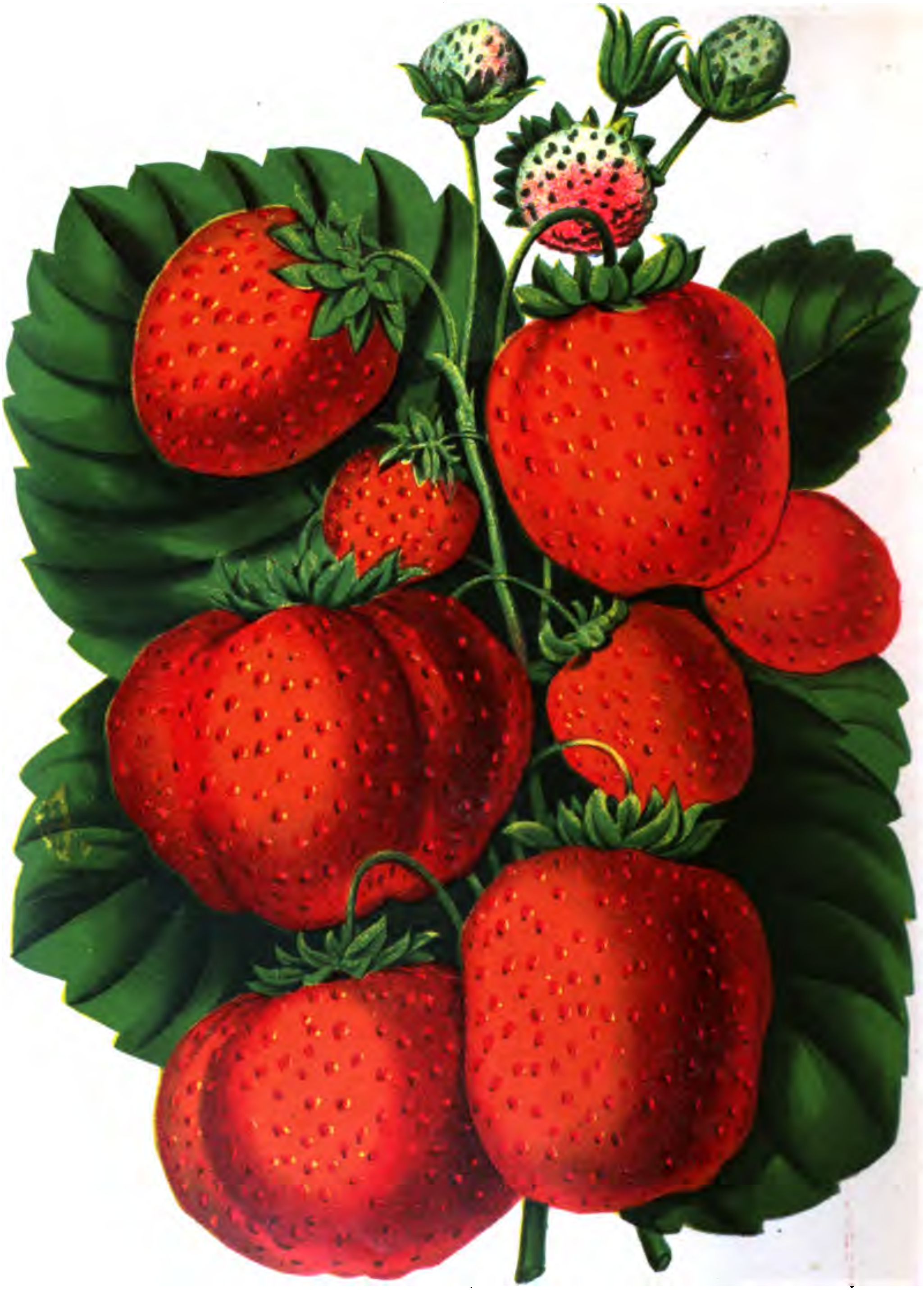
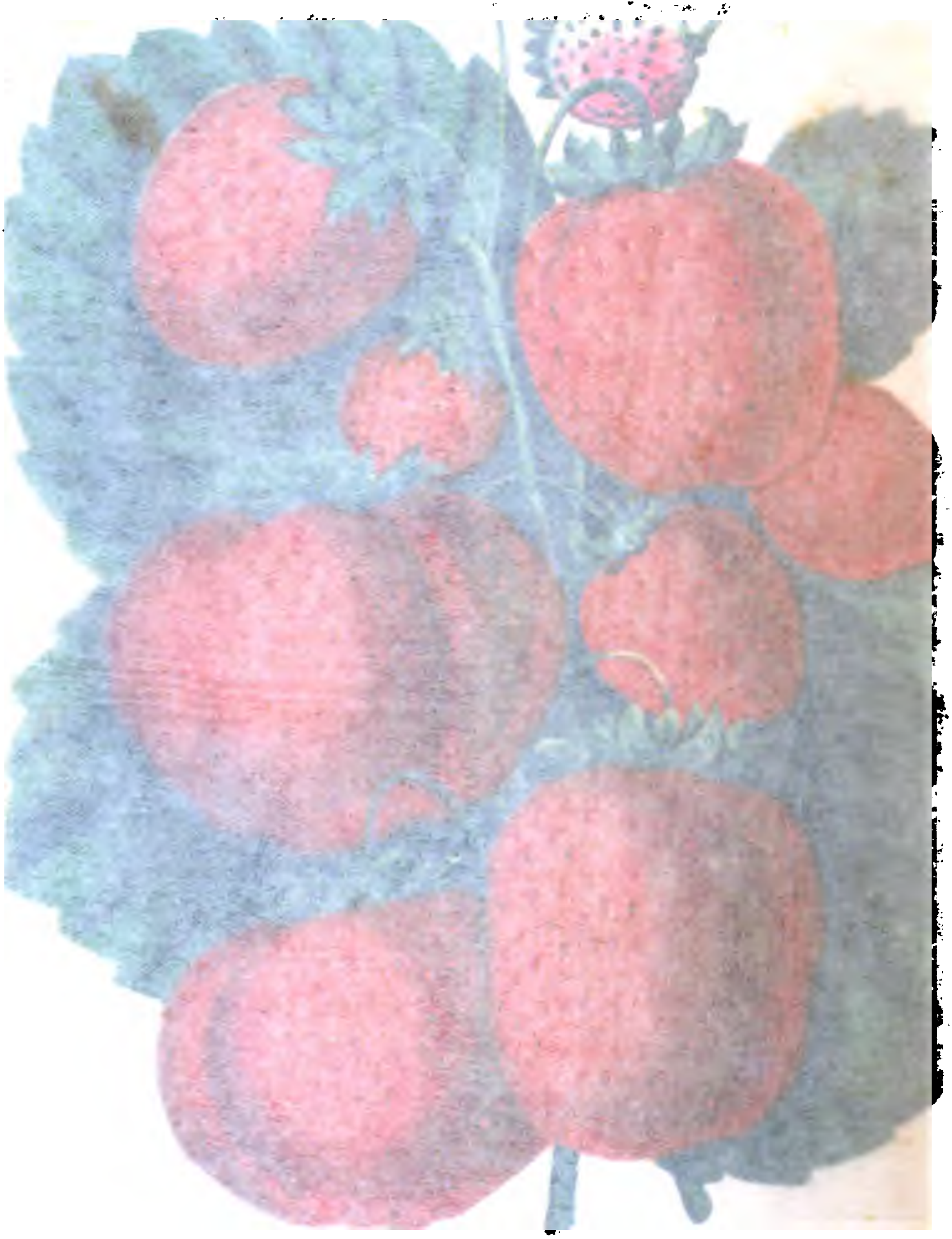


SHARPLESS' SEEDLING.

A PENNSYLVANIA SEEDLING RAISED BY

J. K. SHARPLESS CATAWISSA. PA.

PLANT VIGOROUS & LUXURIANT, HARDY & PROLIFIC. FLESH FIRM, SWEET, WITH A DELICATE AROMA.
FIRST IN QUALITY ONE OF THE MOST PROMISING NEW SEEDLINGS.



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REPORT

OF THE

PENNSYLVANIA FRUIT GROWERS' SOCIETY.

CONSTITUTION.

ARTICLE 1. This association shall be entitled "*The Pennsylvania Fruit Growers' Society*," and its objects shall be the advancement of the science of pomology and the art of fruit culture generally.

ARTICLE 2. Any person may become a member of this Society by a vote of the majority of the members present, at any meeting, and by paying into the treasury the sum of one dollar annually; or the payment of one dollar to the treasurer, at any time, shall constitute membership, and entitle said member to a copy of the proceedings. The payment of ten dollars, at one time, will constitute life membership.

ARTICLE 3. Its officers shall consist of a President, three Vice Presidents, a Recording and Corresponding Secretary, and a Treasurer, all of whom shall be elected annually by ballot.

ARTICLE 4. The following standing committees shall be appointed: A Committee of five on Nomenclature; a committee of three on Insects, of whom the professor of entomology shall be chairman; an Executive Committee, consisting of the President, Recording Secretary, and Treasurer; and a general Fruit Committee; consisting of one member from each county represented, with a general chairman of the whole; each member of the Local Fruit Committee to have the privilege of appointing two assistants.

ARTICLE 5. The Society may at any time elect honorary members.

ARTICLE 6. The Society may from time to time appoint professors on entomology, botany, horticultural chemistry, and geology.

ARTICLE 7. This constitution may be altered or amemded by a vote of two thirds of the members present, at any regular meeting, notice of the proposed amendment, in writing, having been previously given.

ARTICLE. 8. Seven members shall constitute a quorum for the transaction of business.

BY-LAWS.

ARTICLE 1. The Committee on Nomenclature shall collate and decide the standard and synonymous names of all fruits known in the Society, with the authorities for each, and report, so far as practicable, at each regular meeting, and record the same in a book kept for that purpose.

ARTICLE 2. The General Fruit Committee shall carefully and thoroughly investigate the subject of fruit culture in general. Each local committee of three shall collect such useful and interesting information in relation to the subject as may be in their power, and embody the same in monthly reports, to be made to the general chairman; such reports to be by him examined and embodied in his annual or semi-annual reports. Also, that the said county committee shall form *ad interim* committees for their respective counties; and further, that said *ad interim* committees are hereby authorized to publish their reports in the "*Gardener's Monthly*," or such other paper as they may select, the same having been first submitted to the chairman of the General Fruit Committee for his approval: *Provided*, That said publication shall be free of expense to the Society.

ARTICLE 3. The annual meeting of the Society shall be held on the third Wednesday of January of each year, at such place as the Executive Committee may appoint, at which time the election for officers shall take place; said officers to serve from the close of the meeting, at which they are elected, to the close of the succeeding annual meeting, at which time an exhibition and discussion of fruits shall take place, and other business transacted in the following order:

1st. Reading of minutes of previous meeting.
2d. Roll called and dues collected.
3d. Election of officers.
4th. Reports of officers.
5th. Reports of standing committees.
6th. Reports of special committees.
7th. Unfinished business of former meeting.
8th. New business.

The nomination and election of new members shall be in order at any time during the session.

ARTICLE 4. Other meetings may be convened by the Executive Committee at such time and place as they may appoint.

ARTICLE 5. No member who is in arrears for dues shall be eligible for any office, or serve on any standing committee; and any member who shall neglect to pay his dues shall cease to enjoy the privileges of membership.

LIST OF OFFICERS FOR 1878.

PRESIDENT

JOSIAH HOOPES, West Chester, Pa.

VICE PRESIDENTS.

H. M. ENGLE, Marietta.
A. R. SPROUT, Picture Rocks
JOHN I. CARTER, West Grove.

RECORDING SECRETARY.

E. B. ENGLE, Marietta.

CORRESPONDING SECRETARY.

WILLIAM P. BRINTON, Christiana.

TREASURER.

G. B. THOMAS, West Chester.

PROFESSOR OF BOTANY.

THOMAS MEEHAN, Germantown.

PROFESSOR OF ENTOMOLOGY.

S. S. RATHVON, Lancaster.

PROFESSOR OF HORTICULTURAL CHEMISTRY.

S. B. HEIGES, York.

STANDING COMMITTEES FOR 1878.

GENERAL FRUIT COMMITTEE.

John I. Carter, Chester county, *chairman.*
Casper Hill, Lancaster county.
H. T. Darlington, Bucks county.
A. R. Sprout, Lycoming county.
S. W. Noble, Montgomery county
E. J. Evans, York county.
G. H. Small, Dauphin county.
A. S. Sheller, Union county.
W. L. Schaeffer, Philadelphia.
J. Murdoch, senior, Allegheny.
H. S. Rupp, Cumberland county.
G. D. Stitzel, Berks county.
H. Leh, junior, Lehigh county.
Joseph Lewis, junior, Delaware county.
Rev. James Calder, Centre county.
Jacob Heyser, Franklin county.
W. M. Pannebaker, Mifflin county.

COMMITTEE ON NOMENCLATURE.

H. M. Engle, Lancaster county, *chairman.*
Calvin Cooper, Lancaster county.
J. H. Bartram, Chester county.
A. W. Harrison, Philadelphia.
J. W. Pyle, Chester county.

COMMITTEE ON FLORICULTURE.

Charles H. Miller, Philadelphia, *chairman.*
Peter C. Hiller, Lancaster county.
H. S. Rupp, Cumberland county.
S. H. Purple, Lancaster county.
W. P. Brinton, Lancaster county.

COMMITTEE ON ARBORICULTURE.

Howard A. Chase, Philadelphia, *chairman.*
Daniel G. Engle, Lancaster county.
R. B. Haines, Montgomery county.
George Achelis, Chester county.
William Hacker, Philadelphia.

COMMITTEE ON ORCHARDING.

E. Satterthwait, Montgomery county, *chairman.*
W. S. Bissell, Philadelphia.
J. G. Engle, Lancaster county,
E. H. Cocklin, Cumberland county.
T. M. Harvey, Chester county.

COMMITTEE ON INSECTS.

S. S. Rathvon, Lancaster county, *chairman.*
J. S. Stauffer, Lancaster county.
Herman Strecker, Berks county.

LIFE MEMBERS.

Bartram, J. Hibberd, Milltown, Chester co.
Brinton, W. P., Christiana, Lancaster co.
Bissel, W. S., Pittsburgh.
Calder, Rev. James, State College, Centre co.
Cornelius, Robert, Philadelphia.
Ellis, B. Morris, Hughesville, Lycoming co.
Engle, J. G., Marietta, Lancaster co.
Engle, H. M., Marietta, Lancaster co.
Garretson, Joel V., Flora Dale, Adams co.
Hayes, Charles P., Germantown.
Heyser, Jacob, Chambersburg, Franklin co.
Hildrup, W. T., Harrisburg, Dauphin co.
Hoopes, Josiah, West Chester, Chester co.
Hiller, Casper, Conestoga, Lancaster co.
Hiller, Peter C., Conestoga, Lancaster co.
Hacker, William, Philadelphia.
Landis, Israel, Lancaster, Lancaster co.
Martin, J. O., Mercersburg, Franklin co.
Pannebaker, William M., Lewistown, Mifflin co.
Reist, Peter S., Oregon, Lancaster co.
Shaffner, Jacob, Wheatland, Dauphin co.

HONORARY MEMBERS.

Downing, Charles, Newburg, N. Y.
Meehan, Thomas, Germantown, Pa.
Michener, Dr. E., Tough Kenamon, Chester co., Pa.
Parsons, S. B , Flushing, N. Y.
Parry, William, Cinnaminson, N. J.
Rathvon, Prof. S. S., Lancaster.
Rowe, Hon. D. Watson, Chambersburg.
Saunders, William, Washington, D. C.
Stauffer, Jacob S., Mount Joy, Lancaster co., Pa.
Thomas, John J., Union Springs, N. Y.
Warder, Dr. John A., Cincinnati, Ohio.
Willets, Rev. Dr., Philadelphia.
Wilder, Hon. M. P., Boston, Mass.

ANNUAL MEMBERS.

Achelis, George, West Chester.
Biddle, F. C., Chadd's Ford, Delaware co.
Blessing, Paul, junior, Coatesville.
Boas, A. T., Reading.
Brandt, Dr. E. B., Mechanicsburg.
Brindle, A. C., Mechanicsburg.
Brinton, S. L., West Chester.
Brinton, Moses, Octoraro.
Carter, John I., West Grove.
Chaapel, Harry, Williamsport, Lycoming co.
Chase, Howard A., 10 N. Merrick st., Phil.
Chase, R. G., Geneva, N. Y.
Christmas, Isaac F., Stonersville, Berks co.
Cocklin, E. H., Shepherdstown, Cumberland co.
Cocklin, Jacob, Shepherdstown, Cumberland co.
Cooper, Calvin, Bird-in-Hand.
Darlington, Henry T., Doylestown.
Davis, E. M., 205 Walnut Place, Phila.
Dykeman, G. R., Shippensburg.
Eby, J. R., Harrisburg.
Eby, Simon P., Lancaster.
Edge, Thomas J., London Grove, Chester co.
Engle, E. B., Marietta, Lancaster co.
Engle, Daniel G., Marietta, Lancaster co.
Erb, John B., Lampeter, Lancaster co.
Evans, E. J., York.
Fisler, I. E., box 214, Harrisburg.
Foresman, D. H., Williamsport, Lycoming co.
Frantz, M. A., Harrisburg.
Garber, J. B., Columbia.
Greenleaf, R. P., M. D., Henry Clay, Del.
Gross, D. M., Harrisburg.
Grover, Leverett, Windsor, Ohio.
Guthrie, W. D., Chambersburg.
Haines, R. B., Cheltenham, Montgomery co.
Haines, John S., Germantown.
Hamilton, A. Boyd, Harrisburg.
Harrison, A. W., Queen st., Germantown.
Harvey, Thos. M., West Grove, Chester co.
Heiges, S. B., York.
Heiges, J. M., York.
Hiester, Charles E., Harrisburg.
High, Ezra, Reading.
Hoopes, Abner, West Chester.
Hostetter, H. F., Oregon, Lancaster co.
Huber, John, Litiz, Lancaster co.
Kauffman, Levi, 400 Walnut st., Phila.
Kendig, M. D., Creswell, Lancaster co.
Kiner, A. N., Shippensburg.
Landis, B. L., Landis Valley, Lancaster co.
Leh, J. H., Allentown.
Lewis, Joseph, junior, Newtown Square, Delaware co.
Lingle, John L., Harrisburg.
Linn, John, Chambersburg.
Lint, Peter, York.
Longsdorf, H. A., Mechanicsburg, Cumberland co.
Martin, Tobias, Mercersburg, Franklin co.
McMillan, C. C., Gettysburg.
Miller, D. N., Harrisburg.
Miller, Charles H., Mt. Airy, Philadelphia.
Mitchell, J. E., 310 York av., Philadelphia.
Mumma, Hon. D., Harrisburg.
Neff, J., Dallastown, York county.
Nimson, C. H., Allentown, Pa.
Nissley, C. B., Mechanicsburg.
Noble, S. W., Jenkintown, Montgomery co.
Parker, J. T., Mercersburg, Franklin co.
Potts, W. C., Lewisberry, York co.
Purple, S. H., Columbia.
Pyle, J. W., Willow Dale, Chester co.
Reed, William G., Chambersburg.
Reist, Levi S., Oregon, Lancaster co.
Reynolds, S. H., Lancaster.
Rhoads, Dr. R. B., Douglassville, Berks co.
Roberts, Rowland, Horsham.
Rufe, Morgan, Doylestown.
Rupp, H. S., Shiremanstown, Cumberland co.
Rush, John A., McVeytown.
Satterthwaite, E., Jenkintown, Montgomery co.
Saxton, J. O., Mechanicsburg.
Schæffer, W. L., Girard National Bank, Philadelphia.
Sheller, Alf. S., Lewisburg, Union co.

Sheetz, J. A., Womelsdorf, Berks co.
Shelly, Daniel, Shiremanstown, Cumberland co.
Shenk, Major R. W., Lancaster.
Shimer, A. S., Redington, Northampton co.
Shoch, Samuel, Columbia.
Shoemaker, R. C., Jarrettstown, Montgomery co.
Small, G. H., Harrisburg.
Small, Samuel, York.
Small, Samuel, junior, York.
Smith, F. L., Reading.
Snively, John K., Jackson Hall, Franklin co.
Sprout, A. R., Picture Rocks, Lycoming co.
Steck, Dr., Picture Rocks, Lycoming co.
Stevenson, S., Clark's Green.
Stichter, J. L., Reading.
Stitzel, George D., Reading.
Suesserott, Dr. J. L., Chambersburg.
Thomas, G. B., West Chester.
Underwood, Alex., Mechanicsburg.
Weaver, Reuben, Mastersonville, Lancaster co.
Weiser, B. H., York.
Williams, J. S., New Hope, Pa.
Young, John G. B., Reading.
Young, William M., Reading.

PENNSYLVANIA FRUIT GROWERS' SOCIETY.

The nineteenth annual meeting of this society convened in Williamsport, Pennsylvania, January 16, 1878. The local attendance was small, owing to a misunderstanding on the part of the citizens as to the character and objects of our meetings. Somehow the impression got abroad that our sessions would be private, and for the transaction of private business only, and thus many were deterred from being present who were deeply interested in the subjects discussed, and who would gladly have been with us to tell us their experience in horticulture, as well as to hear the views of those from other portions of our State, and from other States. Judged, however, by the number and variety of the papers read and presented, and by the character and ability of the remarks and discussions, it was throughout one of the most interesting and valuable of the many meetings held by this society.

Instead of the customary five sessions, (two on Wednesday, and three on Thursday,) which are usually held at our annual meetings, four only were held at this one, beginning on Wednesday evening, at half past eight o'clock. Business was somewhat hurried in consequence, and several very interesting and valuable papers were not reached during the meeting, but will be published in our annual report. The display of native winter fruits, owing to the almost total failure of the apple crop in the eastern and southern portions of our State, was not so large as usual. There were some fine specimens from Lycoming and adjoining counties, and a plate of California Bell pears, some of which measured fifteen inches in circumference, attracted special attention.

The following fruits were on exhibition, with the names of the exhibitors:

John B. Hall, Williamsport.—An apple similar in shape to Bellflower, color yellow, of brisk, sub-acid flavor, and fair quality; name unknown.

John I. Carter, West Grove.—Krauser, Keim, and Sweet-House apples,

George Balderston, Colora, Maryland.—Jersey Greening, Tewksbury Winter Blush, Jersey Black, Newtown Pippin, and a new variety, of small size, for a name.

H. M. Engle, Marietta.—York Imperial, Creek, and two seedling apples, one a sweet variety, the other resembling Rambo in size and color.

A. R. Sprout, Picture Rocks.—Baldwin, N. Spy, Tallawater, Talman's Sweet, Long Island Russet, and two unknown varieties of apples.

Jesse Showers.—Fifteen varieties of apples, including Gloria Mundi, Red Gilliflower, Esopus Spitzenburg, Hoopes, Newtown Pippin, Talman's Sweet, and a fine display of unknown varieties.

Thomas J. Vickers, Kent county, Maryland, exhibited a very promising looking seedling apple of large size and fair quality. It was regarded as worthy of further trial.

J. Hibberd Bartram, Milltown.—One seedling variety.

A. C. Little, Sullivan county.—Seven varieties, viz: Pennock, Yellow

Bellflower, Rox Russet, R. I. Greening, Hoover, (or Black Cole,) and two unnamed sorts.

Casper Hiller & Son, Conestoga.—Winesap, and one unnamed variety.

J. R. Eby. Harrisburg.—A variety of apple of small size, picked from the tree in October, 1876, and still in good, sound condition.

Peter Lint, York.—One variety, Winesap.

Matthewson & Co., Williamsport, exhibited a collection of California Bell pears of immense size and handsome appearance.

Harry Chaapel, Williamsport.—Three fine specimens of palms.

THE MEETING.

The society convened at half past eight o'clock, P. M., in the rooms of Amazon Lodge, I. O. of O. F.

In the temporary absence of President Hoopes, the meeting was called by H. M. ENGLE, one of the vice presidents. Minutes of last annual meeting having been read and approved, Mr. Engle gave way to President Hoopes, who had in the meantime arrived.

Mr. HOOPES, upon taking the chair, announced that one of the essayists, Mr. S. B. Parsons, of New York, would be obliged to leave early next morning. He hoped, therefore, that the society would suspend the regular order of business, so as to allow the essay to be read at once.

A motion to that effect having been made, and carried unanimously, Mr. PARSONS, after a few pointed preliminary remarks, read the following essay:

HORTICULTURE—ITS PAST, PRESENT, AND FUTURE.

By S. B. PARSONS, *Flushing*, *Long Island*.

Amid all the beautiful things made at Versailles, by the Grand Monaque—grand in name, but petty in nature—there are none more striking, to our unaccustomed eyes, than the avenues of interlacing trees, where the summer sun can have no access, and where the long vistas leave only a patch of sky visible at either end, to the traveler in the middle. To such an one, the perspective and the distance throw a glamour over tree or shrub, man or horse, stump or stone. Thus it is in life's journey. We look back, with regret, over the good old times of the past; we groan over the decadence of the present, and, with amber colored glasses, we look forward to the future, whose tints are, to our eyes, like those of an Italian sunset.

Sometimes, to the man of middle age, the amber fades from the glasses, the disappointments of the present dim the hopes of the future, and he looks back upon the past with vivid recollection of its enjoyment, and but little faith in its recurrence. With this reminder of the natural tendency of the human mind, I will ask you to look back with me, and if we can see any decadence in horticultural taste or horticultural knowledge, seek to apply the remedy.

Fifty years ago I stood upon our steamboat wharf, at Flushing, and watched the crowds that, on every holiday, would come to visit the Linnean Botanic Garden, which then, under the management of the grandfather of the present Senator Prince, offered many attractions. Then, the seed store of Grant Thorburn, in Liberty street, New York, surpassed anything which has been known since. Basins, with gold fish, graced its entrance, while the galleries of the spacious building were ornamented with choice engravings and made resonant with the songs of numerous birds. There seemed, in that old man, with his unique exterior and broad Scotch bluntness, an innate taste, which many a wealthy man might have envied. His son and successor, George C. Thorburn, inherited the taste, with an attractive exterior, a charming manner, and a thorough knowledge of his business. He was one of the best salesmen I ever knew, and was especially happy in portraying the attractions of any new plant.

I was often interested by his fondness for his children, and his pride in their progress. No less striking was his real love for plants—a love independent of their commercial value. When our own business was established, just forty years ago, the number of nurserymen could be counted upon your fingers. There were the Prince and the Bloodgood nurseries at Flushing, those of Hovey, Kendrick, and Winship, at Boston; Downing, at Newburg; Buist & Landreth, at Philadelphia, one at Albany, and several others whose names I do not recollect. Mr. Barry was then with Prince, and until he went to Rochester, and, with Mr. Ellwanger, made a successful establishment, there was scarcely a single large nursery west of Albany. Then prices were remunerative. Sales were large to all the western states. With labor at seventy-five cents per day, cherry trees, now at $150, sold readily at $350 per thousand. Apples, now fifty dollars, sold for $250 per thousand. Everything else was in proportion. As time wore on, other nurseries were established through the country. The West and the South had each its own, and, until 1857, horticulture made steady progress. Country estates began to increase. The banks of the Hudson river, the towns around Boston, the environs of Philadelphia, Cleveland, Cincinnati, and other cities were studded with country seats, the owners of which vied with each other in obtaining everything which was beautiful.

The sales of foreign grape vines showed the increase of glass culture of this fruit. Large Hamburgs, luscious Muscats, and the golden tinted Chasselas were common at our annual shows. Thus it continued until about 1858, when the middle men—the tree dealers—appeared. At first these were composed of ignorant men, who knew very little of plants, and who were remarkable only for their persistence. Subsequently, more intelligent men came into this business—men who employed others under them to travel and solicit orders from every man who was supposed to be in condition to buy a tree. Then the natural result came. These men, having no general knowledge of plants, no appreciation of the most valuable and the most beautiful, would recommend and would sell only those which could be found abundantly everywhere.

Purchasers would gladly save themselves trouble, and order of those who would deliver at their doors something which they were told was beautiful, and knowing no better would be satisfied with the result. Had any of these dealers obtained, at a first class nursery, the requisite knowledge, horticultural taste would have continued to grow. As it was, a decadence commenced, and when in 1860 I returned from a fifteen months' examination of the horticulture of Europe, I was most unfavorably impressed with the commercial prospects of tree and plant culture. I saw clearly, however, that a grape fever was approaching, and we prepared for it. The first venture was two hundred thousand Delawares, grown in frames, under glass. For this, steam irrigation was requisite. Our subsequent cultivation was eight hundred thousand per annum of all sorts. It was a very compact business. Ten thousand Delawares would go in a box four feet square, and shipped by express C. O. D., would bring back $1,000 in a few days.

One incident may illustrate. A man entered our office, and asked whether we would take $4,000 of Government bonds for five thousand Ionas, which we were then selling at one dollar each.

We consented. His plants went in a box four feet square, and he paid over his bonds.

This, as we apprehended, continued only a few years. All over the country glass houses were put up to propagate grapes, and the plants eventually became so abundant that there was no sale. The result was disappointing to the grower of plants, but to the public there was a decided gain. The best Delaware and Iona grapes were retailed in the city markets at five cents per pound.

Then, too, came in the California grapes. When fine Tokays and Black Moroccos were retailed at the corners of the streets for thirty cents per pound, there was little demand for Black Hamburgs or Muscats from under glass. Thus all exotic grape culture at the East began to languish. All ornamental culture was already suffering, because the intelligent men who organized the bands of tree dealers did not realize the importance of knowledge of plants; and looking back through a vista of twenty-five years, I am compelled to admit, that during that time there has been a steady decadence of horticultural taste.

I do not forget what H. W. Sargent has done, and what H. H. Hunnewell, or C. S. Sargent, or P. Wetmore, or Charles A. Dana, or others whom I could name. are doing; but I think of the masses. The masses are dependent on the dealers, and the dealers, with some exceptions, do not value the finest horticultural products.

I do not forget, that with the numerous village residences, has been steadily growing among the millions a desire to plant something—a fondness for flowers. By a decadence of horticultural taste, I mean a falling off in desire for or knowledge of the choicest things.

During this period of twenty years, the steady advance of horticultural taste in England has been marked. Gentlemen there would vie with each other in obtaining every new plant of merit, and old established nurseries doubled or trebled in size.

In this country there has been a marked change in the intelligence and culture of nurserymen within twenty or thirty years; but there existed, twenty years ago, in England, a class of nurserymen, whose intelligence and culture had been marked for years. From the great battle-field of life, we gather up continually our memories of the dead, and two score years have not dimmed my recollection of the pleasant friends of those days, and the white marked hours which they gave me. On my brain there are two pictures upon which I like to think. One was that of a white haired man of eighty, sitting by his fireside in Surrey, on an English morning in November, receiving me with cordiality, and the reverent attention of his sons with affection, while from the window, the broad leaves of rhododendrons enlivened the landscape.

I scarcely knew which most to admire, the affectionate trust of the father or the affectionate reverence of the sons. The other picture is that of a man, also white haired, but still in full bodily and mental vigor. The mind and the body have just passed away, but the memory of Thomas Rivers must always remain as a type of what a nurseryman should always be—a gentleman in thought and manners; of broad culture in things of the world; of special culture in things of his business; of enterprise in all things of which he felt assured; of quick apprehension of possibilities; self-reliant, rather than dependent upon others, and ready to see and to avail himself of the various manias which are always appearing in the horticultural world.

The letters of Thomas Rivers to me, during the war, were very interesting, and full of humor, with a ready appreciation of our national characteristics, and an equal readiness to ridicule our faults or to praise our merits. This frankness made him a pleasant correspondent, for he was equally willing to receive a Roland for his Oliver. I am glad to speak of him here, because he was a type of a class which has made England what it is—the most charming horticultural development in the world.

This decadence in America, which seems to me so clear, is not owing to any want of nurseries, for there are now a hundred where formerly there was one. It is owing, as I have stated, partly to the dealer and partly to the purchaser. The dealer cannot justly be censured for making his money in the easiest way; but if the purchaser really desired to buy jewelry at the price of hardware, he would make himself acquainted with the best kinds, or failing that acquaintance, would write to the grower who produces all, to send him only the best.

If the dealer could be made to see his true interest, he would realize that the sale of one beautiful and rare plant in any town or village, would bring a dozen or a hundred applicants for the same the next season, and establish his reputation as a good caterer to the public appetite. He would then settle himself down for some weeks, each year, near a large nursery, where all these nice things are grown, make himself thoroughly acquainted with them, and be able to describe trees, even to connoisseurs, as Gladstone talks Greek to the Greeks, with perfect freedom and comprehension. He would find, then, greatly increased profit, and horticulture be given a great impulse.

What is needed very much, is a national horticultural society. For a quarter of a century we have met every two years, to give our opinion upon fruits. We have starred, and double starred, and triple starred, and localized every name, until a child can make out a list of the best fruits for any locality, from the catalogue of the National Pomological Society.

We have catered to the palate of the nation, but have done nothing to feast its finer sense—that of vision. Let us have a national horticultural society. Let there be frequent meetings and discussions, and let judicious committees aid its deliberations.

A catalogue, formed from this interchange of opinion, would have great value, would influence public taste, would guide public opinion, and give an impulse to horticulture, which would be felt throughout the country. I know of no one body so eminently fitted to initiate this movement as the Pennsylvania Fruit Growers' Society.

From the soil which Bartram planted, and Cope, and Landreth, and Buist, and others watered, should spring the tree, under whose broad shadows our children and our children's children may find gladness and beauty. I hope that this meeting may not pass away, without taking some steps to establish, as a permanent institution, the National Horticultural Society.

We have thus far looked back with longing to the former days, and we have glanced at the discouragements of the present. Let us now look forward to a brighter future and think with pleasure of the

Possibilities of Horticulture.

During a winter's residence in Paris in 1860, and thinking over what I had seen of the use of glass in England, I built one of those castles in the air which all of us at some time build. Mine was a veritable building in the air, for it was a plan to cover New York houses with glass instead of slate, and convert the top story into a green-house receiving all the waste heat of the house, and making a delightful resort for its inmates. I happened to show the details which I had worked up to John Bigelow, afterwards American Minister, who was then staying at the same house with me. He was then one of the editors of the *Evening Post*, and being pleased with the idea, gave it a place in his paper. Subsequently, the *American Agriculturalist* expanded the plan with excellent drawings, and I hoped to see its frequent adoption. Only two or three, however, have found courage to chrystalize the idea into form, and the plan still remains among the possibilities of horticulture, which, I feel assured, will one day become realities.

Nearly twenty years ago, while wandering over England, I came from behind a mass of evergreens upon the gold embroidered lawn of Elvaston Castle. The effect was beautiful beyond description. All around in sinnous folds lay what seemed the coils of an immense boa constrictor, but was a hollow hedge of English Yew. It formed a compact and dense mass close at the top and sides, rounded in its form, in the distance velvety of texture, and with small gothic windows occasionally in its sides. Being formed of two rows of trees, there was abundant room in the interior for a walk, lighted by the windows at the sides. In the middle of the space inclosed by this hedge, or rather covered walk, grew a large Araucaria imbricata, while around were grouped hooded seats like bonnets, and formed of closely trimmed English Yews. But the great charm and brilliancy was in the Golden Yews of every form. Tall round columns and low pedestals, vases and birds and crowns, footstools and carpets all formed of closely trimmed Golden Yews, were scattered in profusion, while in straight and solemn exterior rows, like sentinels, stood upright Irish Yews and Golden Yews, trimmed to the same pyramidal form. The whole scene was fairy like, and in the moist atmosphere of England, the Yew had the brightness of burnished gold. The same effect is produced here by its young growth in June, but it becomes duller in August under our hotter sun. Yet it is among plants, as gold among metals, or rubies among stones. A very similar effect, though less brilliant, may be obtained here by the Golden Retinospora from Japan, a plant which, for various uses, is one of the most valuable of the many introductions from that country. Hardy among the hardiest, it is a rapid and healthy grower, and retains its golden tint throughout the year. It can be trimmed into various shapes as fancy may suggest, and when closely trimmed, will make a hedge of great beauty.

Some of the yews transplanted to Elvaston grounds were six hundred years old. Some of these, with large Cedars of Lebanon, were brought forty miles by the ingenious machinery contrived by Mr. Barron, who was then in charge. The finest existing avenue of Picea Nobilis was thus formed there, and no cost was spared to make one hundred and thirty acres of kept gardens all that a cultivated taste could desire.

In looking at Elvaston grounds, one is forcibly convinced that there is no limit to the possibilities of horticulture.

Different in its character, but scarcely less beautiful, is Trentham, the seat of the Duke of Sutherland. Upon a charming lake bounded by masses of rhododendrons and azaleas, the grounds are ornamented in every style which a cultivated taste can suggest. It is remarkable, however, for the perfection of its fruit forcing arrangements, which make a range of glass-houses four hundred yards long, with a delightful promenade through orange and peach trees and under clusters of unrivaled grapes. There are also pits for forcing pines and melons and all the varieties of vegetables which a luxurious table may require.

England is full of these beautiful places, which will rarely be copied here, because, in the absence of laws of primogeniture, wealth is quickly distributed and valuable estates rarely remain in one family more than two generations.

I name these because they are among the possibilities of horticulture, possibilities even in this country, where Mr. Hunnewell has made at Wellesley, near Boston, a landscape of tree and turf, lake, and Italian garden which the Duke of Sutherland might admire, and which none in this country yet equal.

In these same wanderings I stumbled upon another marvel of taste and ingenuity. While visiting the quaint old town of Chester, and walking over its roofed pavements I learned that Lady Hamilton was the owner of a most effective and curious piece of rock landscape in the vicinity, and kept it somewhat excluded from the public gaze.

With the owner of my best half, I therefore endeavoured to get a glimpse of it. We drove to the entrance gate and found it barred and bolted.

No true American likes to be thus excluded. My companion could not, with dignity, scale the gate, so we searched for some side entrance, and discovered one near a gardener's cottage, by a walk lined with high and close hedges, through an opening of which we turned and found ourselves face to face with a courteous and stately lady armed with gauntlets and pruning shears.

Lifting my hat, and summoning all the courage which a Yankee is supposed to possess, I explained that we were Americans, had heard of the extraordinary beauty of her grounds, and ventured to intrude upon her to ask of her courtesy the privilege of seeing them. She met our explanation with the utmost politeness, and, with the perfect manner of a high bred English lady, invited us to enter. From the seclusion of the hedge we opened suddenly upon the lawn. The illusion was perfect. There were scarcely two acres of ground and yet there appeared a broad valley with alpine mountains.

The foreground was a flat surface of well kept turf, dotted with occasional low clumps of plants, and extended out to a crescent of rock-work, which stretched its horns around half the lawn. These rocks were piled one upon the other, in all sorts of irregular forms, to the height of twenty feet, sometimes precipitous with pockets of earth, and sometimes sloping upwards with a gentle ascent. Upon these pockets and spaces of soil were planted Irish yews, junipers, and other pyramidal trees, so arranged that it was difficult to realize that the foreground did not cover miles of plain, that the rocks were not truly Alpine heights, crowned by Alpine forests.

The small space of ground occupied by this design would make it easily copied in this country. I mention these three places because they are types of what may be found all over England. Why cannot they be found here? The answer lies in the facts I have already stated, and also in the two facts, that good gardeners are rare, and that owners do not acquire the requisite knowledge. Good gardeners are rare, because employers, who would not hesitate to pay $3,000 to a book-keeper, whose art can be acquired in a year, hesitate to pay $1,000 to a man whose art is the result of ten or twenty years' experience. The good gardener is thus tempted to go into business for himself, and his place is taken by a man who professes much, but knows little, who, according to his own story, has been gardener to lords and earls, but cannot distinguish an elm from a horse-chestnut. Making blunder after blunder, he exhausts the patience and the purse of his employer, who knows nothing of plants or soil, and who finally decides that a country place is a nuisance.

All this results from the cause that the employer does not inform himself. If he recognized the fact that a well-cultivated garden, and a well-planted and shaven lawn are to the home, what the gold is to the frame, or the color to the picture, he would devote half an hour every evening to reading up, as he would read himself up on anything pertaining to his business. He would visit various kitchen gardens, and copy the best features of each. He would visit parks and nurseries, make himself familiar with the varieties of trees and shrubs, and be able to appreciate all the forms and foliage tints which can make a lawn like one of the landscapes of Claude Lorraine. He could, then, with the assistance of ordinary laborers, have his tables loaded with the finest vegetables and the most luscious fruits, while his children could look upon trees whose varied forms and colors would charm their eyes as a veritable Murillo would charm an artist.

Some will now ask me, what are those trees and shrubs which produce these marvelous effects? The effects are not marvelous, but are simply the results of a tasteful combination of the materials which nature bountifully holds out for the hands of every man.

These materials I can only rapidly sketch in the limited time of this evening.

Have you a road or street passing by your grounds? Plant it with these:

The *Tulip tree*, rapid in growth, stately in form, and with a shadow of gold in its light tinted foliage.

The *American Chestnut*, with its rapid growth, its shining foliage, and its feathery flower is a very desirable tree for streets. Its only objection is, that when it bears, small boys will swarm like bees upon its branches.

The graceful and gothic like arches of the *American Elm* are well-known.

Few trees are more valuable for streets than the Linden; the *American*, for its large leaf and rapid growth; the *Silver*, for its very light foliage, and the common *European*, for the fine avenue effects, which are best ilustrated on the Champs Elysée, at Paris.

The *European Beech* is one of the finest of street trees. Time, however, is requisite to show its beauty. The *Pin Oak* is more rapid, and its beauty we have tested in an avenue planted on our grounds twenty-five years ago. The *Maples* are deservedly favorites—the *Norway*, for its round head and dense foliage; the *Sugar*, for its more pyramidal and upright habit; the *Ash-leaved*, for its light foliage and its great rapidity of growth, and the *Scarlet*, for its brightness in spring and its brilliant tints in autumn. The *Liquidamber*, for its pyramidal form and purple autumnal tints, and the *Oriental Plane*, for its great rapidity of growth, are both valuable street trees. But the tree of all trees, when a beautiful line, rather than shade, is desired, is the *Chinese Cypress*. Imagine a line of trees, symmetrical as an arrow and clothed with pea green leaves, of unique shape and down-like softness, and you will have but a faint idea of the superb effect of an avenue of Chinese Cypress.

Your outside lines will next claim your attention. These should be evergreens, because you will desire seclusion both summer and winter.

If you have a patient spirit, if you are willing to wait for the best effects, plant the Nordmann Fir. It is an evergreen, which is absolutely satisfactory. My specimen, planted in 1860, is nearly thirty feet high. Its branches are close and compact, its foliage is glossy, rich, and dark, and its wood is sufficiently tough to resist all ice storms.

Next to this, I like the *White Pine.* I like its stately trunk, its soft, feathery foliage, and the ocean music of the wind among its branches. Its brittle wood is sometimes broken by ice storms, but its growth is rapid, and it will always give pleasure.

The well-known *Norway Spruce* is always safe to plant. Its growth is rapid, and, when young, the contrast of its new and old shoots is very pleasing.

The *Hemlock*, with its fine leaf and graceful habit; the bright green and rapid growing *Austrian Pine;* the steel-tinted *Scotch Fir*, and the conical, compact *White Spruce*, can all be used for your outside lines.

You have, thus, your outlines, and upon these can now be embroidered all sorts of beautiful forms and colors. Aim at strong contrast. Plant the graceful lightness of the *Virgilia* beside the rich darkness of the *Purple Beech;* the *Red* and *White Horse Chestnut* side by side*;* the graceful cutleaved Birch by the cutleaved Alder; the American Chestnut by the Tulip tree. The European Beech and the Purple Beech can go together. So in pairs or trios you can plant the *Dogwood* and the *Sassafras.* Masses of the former make the woods, in the flowering season, gleam like snow-flakes, while the fragrant and tinted flowers of the latter make a blood purifying drink in spring.

The *White* and *Purple Fringe* can go together. The former is one of the most charming flowering trees known, and the latter, under its familiar name of *Smoke tree*, has been a deserving favorite for generations. The *double scarlet* and *double white Hawthorn* can keep each other company, and in beauty are rarely surpassed. The *Weeping Beech* must stand alone, with plenty of room for its cathedral-like form and its wide spreading, drooping branches. Nothing can surpass the grace and beauty of my specimen forty years old. The *Chinese Magnolias* give their abundant and showy bloom before the leaves make their appearance in the spring. Of these, the pure white *Conspicua*, and the rich purple *Lenné*, with its silver lining, should go together. The *Thompsoniana* and *Gracilis* can consort. The *Cordata* can show its yellow, twice blooming flowers, at the side of the white *Macrophylla*, on which grows the largest tree flower in this latitude, and leaf surpassed in size only by that of the Paulownia.

The *M. Soulangeana* and *Norbetiana*, although not strongly contrasting, can go together, while the fragrant *glauca* and the exquisite *Halleana* can look up, side by side, at the stately and pyramidal *acuminata.* All these Magnolias are indispensable to any place which merits ornament. The *Halesia*, with its snow-drop flowers, the *Kolrenteria*, with yellow racemes standing up above the top of the crimped foliage, the *Snowy Mespilus*, the *Japan Persimon*, with its rich and golden fruit, the *Laburnum*, with its profusion of drooping yellow racemes, the *camellia flowered Peach*, unsurpassed for the exquisite richness of its color, the *Japan Sophora*, the *American Mountain Ash*, with its profusion of golden berries, the *Euonymus*, or *Burning Bush*, with its brilliant scarlet seed vessels, and the unique *Salisburia*, stretching out its branchless arms, clothed with abundant fern-like leaves, all are needed to perfect the beauty of your grounds.

The *Kentucky Coffee Tree* should not be forgotten. Its naked limbs, destitute of spray, give it a marked character in winter, while its clean, delicate foliage, and its habit of turning up its leaf-edges to the sun, give the appearance, without the reality, of dense foliage. This peculiarity would make it also a good street tree.

The *Judas Trees* are very bright, with their pink flowers covering the branches. The *Japan* species, more dwarf than the *American* or *European*, has more abundant, larger, and deeper colored purplish-pink flowers. Nothing in its season is more showy, and it is among the most beautiful of the introductions from Japan. If you have room, plant all the Oaks. There are fifty or more varieties, including the *atropurpurea*, as dark as the purple beech, the *concordia*, with its rich golden color, the *pendula*, with its graceful weeping branches, and the *argentea*, whose silver edges are like a cloud with the sun behind it.

Some thirty years ago I planted on my lawn all the varieties of American oaks, and few of my trees give me now more pleasure. The *Larch*, with its refreshing color should not be forgotten. The *leptolepsis*, from Japan, is the best, then the *glauca*, with its light colored foliage, and the common European, darker in its tints. They all contrast well together. Against these stately trees should be embroidered at a proper distance the lower weeping varieties, the *weeping Birch*, the *dwarf weeping Cherry*, the *weeping Sophora*, a striking and beautiful tree, the *weeping American Cypress*, a new variety of decided character, originating at Flushing, and throwing its branches to the ground as decidedly as the well known Kilmarnock willow. The *American weeping Willow* is as decided in its droop as a fountain; the *Camperdown weeping Elm* curves down like an umbrella, while the *weeping Slippery Elm* has long graceful curves, which are very beautiful when grafted on a tree twenty feet high. The *weeping Larch* throws down its small branchlets, while its long arms reach out in giant length as if it would grasp all its neighbors. Its picturesque grotesqueness make my specimen, twenty-five years planted, one of the most striking of trees.

Among more recent introductions are many which the true connoisseur will seize with avidity.

Acer colchicum rubrum novum is a very attractive maple, with its red shoots, leaf stocks, and young leaves. *Acer schwedleri* is very handsome, with young shoots, leaf stalks, and young leaves of a bright purplish crimson. *Acer laciniatum*, *occulatum*, and *sobergii* are all striking varieties. The *cut-leaved Horse Chestnut*, with its shred like leaves, is very unique. The *fastigiate Birch* is, like the Lombardy Poplar, distinct in its shape; the *elegans* and the *youngii* with their pendulous heads, are among the most beautiful of weeping trees. The *purple Birch* is of recent origin, and its dark purple leaves contrast beautifully with its white bark. The *weeping variegated Cherry*, the *weeping jaspidea Ash*, the *weeping Honey Locust* with the delicate foliage of its parent, Bujotii, the curious *cut-leaved Madeira Nut*, *cut-leaved Linden* with its rose colored bark, and the *golden Linden* with its yellow bark and foliage. The *Ulmus berardi* and *viminalis* are beautiful miniature elms, and the *Siberian Elm* is remarkable for holding its leaves long after other trees are stripped by the frost.

Decidous trees, among which are those I have mentioned, should never be planted with evergreens. Contact spoils both, and I will name here a few of the last which contrast well. There can be planted together the *common* and *silver-leaved Hemlock*, the *Norway spruce* and its long-armed child *elata*; the *oriental Spruce*, with its delicate refined tone, and the sturdy but compact *white Spruce*, with its glaucous tint. *Abies polita*, with its brown arms and its compatriot *alcoquiana*, can go together; while Menziesii, with its steel colored, sharp leaved arms can defend them both.

The Piceas *nobilis*, *grandis*, and *pichta* can go together. The *Cephalonica* and the *Cilicica*, the delicate *amabilis*, and the *Parsonsii*, with its leaves curling up over the stem, pronounced in England, where we sent it twenty years ago, the finest conifer known look well in groups. The most striking conrast is made by the *Nordmann fir* and the *Engelmann spruce*, the former rich, dark, and glossy, the latter with a soft delicate sage blue tint, rarely found except in some of the tints of an autumn sunset.

The *Austrian Pine* and the *Scotch Fir* can go together, the graceful Mexican pine *Ayacahuite*, with its light colored pendant branches, and the darker *Monticola* Pine, with its stiffer form.

The *Atlas Cedar* should be planted by itself, and, if possible, near an upper window from which only its beauty can be fairly shown, the leaves growing thickly on the upper side of each branch. It is the nearest approach to the Cedar of Lebanon possible in this climate.

Now that your trees are planted, your work is more than half done, for your foreground can be filled up with shrubs at your leisure. They are easily transplanted, and can be moved about at pleasure until you get the color contrasts you desire.

However beautiful are recent introductions, I have a lingering fondness for old favorites. Their associations always bring up pleasant memories. When a child, my chamber window opened upon a large *Syringo*, crowned with white flowers, in June, whose fragrance would be wafted over my bed, while a cat bird, with its horrible call, followed by its sweetest note, would tell me to get up.

The fragrance of the young leaves of the common *Lilac* bring up now memories of the old home, whilst the *Purple Fringe*, with the western sun glinting its brown, seems like a golden memory of distant days.

The brilliant clusters of the *Trumpet Creeper* overhung the study in which, then some eight years old, I was locked away from all the breathing charms of a day in June, until I could recite without failing my hic-haec-hoc.

How I delighted to crack the full bladders of the *Colutea* and carry *Sweet Scented Shrubs* in my hand until the heat brought out their delicious fragrance. The woods were then crowded with the white clothed *Dogwood*, and I can hear in memory now the mellow notes of the thrush bidding farewell to the setting sun. The currants and strawberries of that day had a flavor unknown now to my older palate, while I wandered about my father's garden picking here and gazing there, and wondering if the world held anything half so beautiful as those perfect days of June.

Yet, although dreaming over those days, we must not forget the acquisitions of the present. While thinking of the silver of our own, we must be willing to see the gold of our children's youth. A new gem in the crown of a monarch will sometimes out shine the old, and the whole world is full of newly discovered beauty, to charm our eyes and thoughts.

In our early days we knew very little of the *Rhododendron*, with its broad rich evergreen foliage, and its numerous varities with brilliant colors.

The *Ghent Azalea*, that gem of shrubs, without which no garden of taste can now be supposed to exist, was then rarely seen. Now a hundred varieties are found, with shades of white, salmon, orange, scarlet, pink, and yellow, at least one quarter of which are American seedlings.

We knew nothing of the snow-white *Exochorda*, the fragrant *Daphne cneorum*, the various *deutzias* and *spireas*, the *Forsythia*, with its golden bloom, the *Oakleaved* and *Japan Hydrangeas*, the former unsurpassed in its autumnal foliage, the latter unequaled for its autumnal flowers.

The beautiful *Stuartia*, with its white fringed petals, the *Callicarpa*, with its blue berries, the *Silver Eleagnus*, the vigorous *Japan Privet*, the *Dwarf Horse Chestnut*, the *Purple Daphne*, the autumnal tints of *Rhus Osbeckii*, the *Japan Snowball*, and the various *Weigeleas* were all unknown.

The dwarf *Spruces*, and *Pines*, and *Firs*, and *Arbor vitaes*, and *Junipers*, and *Yews*, and *Retinosporas*, and *Pyracanthas* were many of them unknown, and others rarely seen.

Weeping evergreens then were scarcely known; now, among weeping trees, we have two *Spruces*, several *Junipers*, an *Arbor vitae*, a column-like *Silver fir*, whose drooping branches hug the stem, and a *Hemlock* which is an evergreen fountain, and of marked beauty. Then again, there are thousands of varieties of *Roses* formerly unknown. The old *June rose* is surpassed by the brilliancy of *Jacqueminot*, and the golden beauty of *Marshal Neil* was then undreamed.

The *Kalmia* or laurel, abundant in some woods, was scarcely seen in gardens, and the *American Holly* was very rare.

Then, within a few years, have come in the remarkable acquisitions from Japan, hardy, vigorous, and of surprising beauty in both foliage and flower. The blue *Daphne genkwa*, the silvery white *Eleagnus longipes*, the variegated *Ash*, the *Daimian oak*, and all the charming *Retinosporas*, including the *Golden*, which bids fair to be popular as the most showy evergreen hedge plant known.

None of the introductions from Japan, however, promise to be so popular as the *Japanese Maples*.

They have proved perfectly hardy during ten of our severest winters, and they are constant in their colors under our hottest suns. Dwarf in their habit, they are adapted to town yards or cemetery lots, or for grouping on a large lawn. There are many varieties; some with highly colored leaves, from a pure white variegation to pink and dark purple, and others deeply cut, like lace. A single plant will bring out an exclamation of pleasure. A mass of them is a thing to be remembered.

Among the luxuries of modern times, prepared for him who

> " Wraps the drapery of his couch about him,
> And lies down to pleasant dreams,"

are cemeteries. These are generally laid out with taste, but planted without regard to taste or expediency, excepting in the case of Laurel Hill and one or two others, which have been controlled by men of culture.

The chief fault is too great an abundance of large trees, the roots of which permeate everywhere, and prevent the introduction of small plants.

In a cemetery lot nothing should be planted but the weeping trees and the most compact shrubs. The dwarf evergreens, the rhododendrons, the azaleas, and the weeping evergreens are particularly adapted to it.

The same remarks will apply to town gardens, which you will frequently see filled up with two or three large maples, and many trashy shrubs, while all the beautiful things which might be there are neglected. All this can be corrected only by informing the people.

I spoke to you of the possibilities of horticulture, possibilities which many of you may think are only dreams; and yet, forty years' experience of the habit and growth of trees, leads me to hope that my dreams may yet be chrystalized into realities.

May I dream to you of an ideal country home? It shall be fifty acres—enough for pasture and wood land, for garden and field. The wood land should consist of all the ornamental deciduous trees known, while all the shrubs and evergreen trees should form outlying points and arms, or be scattered about in groups and single specimens.

A rustling brook, over rocks and stones, by winding courses, should come from a source high enough to give fountains and cascades, and on its sloping banks should be masses of rhododendrons and azaleas.

Hedges of pyracantha should divide the fields in which my Alderneys and Durhams grazed. Where no cattle ran, and separating the kept grounds from the fields, I would have ornamental hedges of flowering shrubs, of California Privet, of Japan Quince, of Erect Yew, of Irish Juniper, of Conical Spruce, and of the Hemlock, with its old and young growth, like mother and child in its beauty.

A rose garden should be there, and be surrounded with hedges of Golden yew and Golden Retinospora. Near the house, which should not have a mansard roof, should be all sorts of showy bedding plants. The *azalea* amaena should be planted in mass, while the rhododendrons and hardy azalea should be freely used. Around all unsightly buildings should be screens of arbor vitæ, or Norway spruce, trimmed into a wall.

There should be a walk of European Beech, planted in double rows so closely that they would meet at the sides and top, and be trimmed into a compact wall and roof of foliage with windows cut in the side. If an occasional Purple Beech should be introduced there would be a picturesque variegation. A single row of weeping Beech should cover a walk with its overhanging branches and close exterior. I know that you would come miles to see it.

My home should be for the winter, as well as summer, and there should be a promenade from the house a hundred feet long, covered with glass, without fire, into which should be gathered Portugal laurels, English hollies, and all the broad leaved evergreens which make southern England one of the fairest pictures.

Or, if something more beautiful should be desired, a little heat could be provided, and it could be filled with oranges, oleanders, cape jessamines, lagerstraemia, magnoliafusca, camellias, and the many other plants which flourish in a low temperature. But I will not intrude upon you more of my imaginations.

There is no limit to nature, and there is no limit to man's taste, if he responds to his opportunities for culture.

The elements of beauty are all around him, but not in him. It cannot therefore be educated out of him, but must be inducted into him. Knowledge and culture must go together, and there must be a teacher. Where can an efficient teacher be found? The answer lies in the success of the National Pomological Society. That society was the teacher of the people in every thing pertaining to fruits, until now the merits or faults of every variety are either well known or easily ascertainable.

Horticulture has a wider field than pomology, and a national horticultural society would be the teacher of a large population. I have already alluded to this, but I would reiterate the essential need of a national horticultural guide.

Under its teachings, the aggregated opinions of all experts would be gathered up, and sown through all the States, and in a few years we should see the result—in improved farm-homes, villa sites, town lots, and cemeteries—all homes of the people.

My time has now expired. I have led you, by a somewhat wandering path, through the fields and lanes, which I like to travel, and my words are more a friendly, discussive talk, than a discussion or an argument.

I would be glad if any wandering words of mine should find lodgment in good soil and bear fruit.

I would like, in conclusion, to leave with you the thought, that if any reverence is due the man who can place in stone, or upon canvas, the ideals of his brain—who, out of dead matter, can make a lifelike form, so an equal reverence is due the true horticulturist, who, if he knows his privileges, can grasp the forces of nature, chrystalize them into living forms of beauty, and, grouping them in all the shapes suggested by a fertile brain and taste, produce scenes more charming than Phidias ever carved or Apelles painted.

For all this, we need a teacher and a school. Let us find them at once, and a few years hence, when we meet again, let us all say that our *alma mater* is the American Horticultural Society, and that horticultural art is the highest art all the world over.

The regular order of business having been resumed, on motion, the calling of the roll of members and collection of dues were dispensed with.

Election of officers being next in order, the chair appointed the following committee of three, to make nominations, and report at a future meeting: Messrs. George H. Small, James Calder, and J. Hibberd Bartram.

Reports of officers being next in order, the Treasurer's statement was read and referred to Messrs. Thomas M. Harvey, Charles H. Miller, and P. C. Hiller, as a committee of audit:

GEORGE B. THOMAS, *Treasurer, in account with Pennsylvania Fruit Growers' Society.*

1877.		*Dr.*
January 17, to cash on hand,	$265 26	
January 17 to February 17, to cash from annual dues,	49 00	
		$314 26

		Cr.
January 18, by cash paid E. B. Engle, as per bill,	$35 53	
January 18, by cash paid E. B. Engle, as per bill,	6 40	
January 18, by cash paid E. B. Engle, as per bill,	1 50	
January 24, by cash paid F. S. Hickman, as per bill, making drawing of fruit,	6 50	
April 10, by cash paid Dr. E. J. Nolan, as per bill, making drawing of fruit,	18 00	
December 10, by cash paid Dr. E. J. Nolan, as per bill, making drawing of fruit,	6 00	
By cash paid stamps and envelopes,	2 40	
By cash balance,	237 93	
		$314 26

Mr. ENGLE asked that the programme, or list of subjects be read.

President HOOPES regretted to state that three or four of the essayists and speakers, who were announced upon the programme, would not be present. Neither Mr. Fuller, of New Jersey, nor Mr. Saunders, of Washington, could possibly be with us. Mr. Edge, Secretary State Board of Agriculture, and Judge Stitzel, of Reading, had also been expected until within a few days. The latter, he was sorry to announce, had been detained by death in his family. Hoped the meetings would be well attended, and that all interested in fruit culture would be present. We wish to make the State of Pennsylvania a model one in horticulture. To do this, we wish to hear the experience of those engaged in horticultural pursuits in every section of the State.

Mr. **ENGLE** moved a vote of thanks to Mr. Parsons, for his very entertaining essay; which passed unanimously.

Mr **PARSONS**, in returning thanks to the Society, was pleased to see the interest manifested in horticulture. Has advocated the forming of a National Horticultural Society, and hoped it would not be out of order to introduce the subject at this meeting. Would be glad to see the organization of such a society begin here. Officers might be appointed and notices sent to all local horticultural societies to assist in establishing a permanent society.

President **HOOPES** did not doubt the usefulness of such an organization, and would be pleased to see it accomplished, but did not consider it feasible. Requested Mr. Meehan to give his views upon the subject.

Mr. **MEEHAN** did not exactly see the way clear for the formation of such a society. Was much interested in Mr. Parsons's idea of the decadence of horticultural taste in this country. Thought, however, there were other and deeper causes which no national society or other organization can remove. There is manifest in late years a greater disinclination toward country life. During the past ten or fifteen years facilities for pleasure travel have greatly increased. We can now almost as easily go to the Rocky Mountains as we then could make a trip to Pittsburgh, and our railroads are carrying pleasurs seekers to all parts of the United States. The increased facilities afforded all classes for visiting the mountains, the sea-shore, and the many rural summer resorts are some of the reasons why horticultural tastes have apparently declined, and which no society can counteract or remove. He did not think, however, in view of the extensive public parks and grounds that have been laid out in many of our cities, that horticultural taste had materially declined. In fact many of them show a greatly improved taste in this direction. Before organizing such a society, we should not shut our eyes to what is before it. While much valuable information could be disseminated, it would subject members to considerable expense to attend its meetings and meet its necessary expenses. The American Pomological Society, an old and kindred organization, national in its character and influence, finds its treasury generally empty, and its work and usefulnesss constantly cramped for want of funds. So with a national horticultural society. An organization may easily be effected, and a list of members enrolled, but the great difficulty would be in keeping it up.

Mr. **PARRY**, of New Jersey, did not feel like adding anything to what has already been said on the subject. The idea is a new one to him, and apprehended some difficulty in keeping up such an organization. Would be glad to assist, but could not promise much.

Mr. **PARSONS** thought there would be no difficulty in getting members together, and awakening an interest in this movement. As to the expenses incurred, and the means to meet them, he did not know. Could not agree in the opinion that horticultural taste had not declined. A chromo is a good thing to an uneducated eye, but to a cultivated taste it cannot be compared to a painting. So, in true horticulture taste, there has been a marked decline. If we had a national society, its opinion on horticultural questions would be a guide and a *dictum* for all. It would be a teacher, through which to educate in matters pertaining to horticulture. Local societies, such as Massachusetts or Pennsylvania now have, are most useful in their sphere, but they cannot have the general influence that a national society would have.

President **HOOPES** was somewhat discouraged by the experience of the American Pomological Society. Since its organization it has been always embarrassed by debt. Even admitting that the new society, which it is proposed to organize, has features which would make it more popular, he doubted the feasibility of the project.

Mr. **CHARLES H. MILLER** had seldom listened to an address with so much pleasure, as the one just delivered by Mr. Parsons. His views are those of an artist in horticultural taste. Would, however, differ with the idea advanced that evergreens and deciduous trees could not be planted together, with good taste. Thinks in landscape planting outlines would be monotonous, without a blending of the two. Taking nature as our guide, too, we must not discard deciduous from evergreen trees.

Mr. **PARSONS** was, perhaps, a little lame on this point, and did not wish to make the remark general. He meant that evergreens should not be planted in among deciduous trees, so that the foliage of one would injure the other.

Mr. **MEEHAN** did not wish to discourage the idea, but to present some of the difficulties that must be met. The London Horticultural Society is within twelve hours' ride of forty millions of people, while here the great extent of country over which a comparatively few earnest horticulturists are scattered, would be the great hinderance to its success.

Mr. **BALDERSTON**, of Maryland. Most of the work of the American Pomological Society is done by one or two members from each State. The chief obstacle to its success, however, is not men, but financial aid. Thinks, however, that by a judicious sale of its reports, considerable revenue could be raised.

Mr. **ENGLE** hoped that before adjourning this session, the society would decide upon the time of final adjournment.

President **HOOPES** thought that would depend upon the amount of business which would be brought before the meeting. Sessions very seldom continue over the second day, and thought we would be able to adjourn on to-morrow (Thursday) night. Called attention to the fine specimens of fruit on the tables of the Society, and hoped the committee on nomenclature would not fail to report upon them.

On motion, adjourned to half past eight o'clock, Thursday morning.

MORNING SESSION—THURSDAY.

Business was resumed at nine o'clock.

Mr. **CARTER**, chairman, general fruit committee, read his annual report:

REPORT OF THE GENERAL FRUIT COMMITTEE.

To the Pennsylvania Fruit Growers' Society:

The chairman of the general Fruit Committee regrets to have to commence his report with an apology for the lack of valuable information in it. Some interesting sub-reports were received, for which our thanks are due; but the unexpected meagerness of the aid from this source has obliged the chairman to depend largely upon his own inefficient knowledge.

Perhaps, correspondents have been discouraged from reporting, as the meagerness of past season's fruit crop, as affording nothing very encouraging to say.

The apple crop of Pennsylvania, as far as we can learn, is below the average, even for an *off year*. Various reasons are given for this. The continued cold rains, during the blooming season, retarded the ripening of the pollen, inducing imperfect fertilization, and a thin set of weak and easily detached fruit.

Mr. Hillar, of Lancaster county, speaks of this, and says: "cherry trees were in full bloom for three weeks, when, under favorable circumstances, a cherry blossom will open and perform its functions in one week."

The ravages of insects—curculio—and codlin moth, are not only more apparent and disasterous, but more vigorous from the increased numbers, growing out of the previous season's abundant feeding.

Of course, failures from unfavorable seasons are beyond our control; but certainly something can be done to secure greater uniformity of bearing, by good manuring and care, and extra fertilization during the *bearing year*, that the trees may be ready, with vigorous growth, and well developed buds, for another good crop. This, with the careful selection of grafts, from off year bearing trees, and watchfulness during early fruiting to prevent over bearing, might do something towards securing more uniform crops.

More care given to the destruction of insects would also aid in this direction, as it is well known we suffer more from them during years of scarcity of fruit.

Alkaline and potash washes for the trunks and larger limbs will destroy many eggs, and infesting lichens, and fungi, and be washed down to fertilize the roots.

Mr. Sprout, of Lycoming county, recommends a mixture of ashes, salt, and copperas, in solution, as a suitable dressing for the trunks and roots of apple trees. Various devices for catching moths and insects, though very partial, are, no doubt, aids, as is the protection of insectiverous birds. Too much stress can hardly be laid upon this point. As fruit growers, we soon learn to love beautiful trees and flowers, and with them the ever cheerful and sweet songster that flutters through their boughs.

I was somewhat surprised, though, to hear from one correspondent a complaint, that the pheasants had, during the past winter, eaten the apple buds from orchards contiguous to timber lands. It sounded strangely, because the pheasant is so rare a bird with us, so rare, indeed, that we would like to see more of them.

Perhaps the winter plowing of orchards might aid in the destruction of worms and larva by unexpected exposure to the winter freezings. It is considered effective with some of our farm crops, and might be so in our orchards. I have plowed a portion of ours the present winter, and in due time will report upon it.

I hope this society will urge fruit growers, and farmers generally to adopt every reasonable and available expedient likely to make their trees more healthful and fruitful, believing that the more an intelligent grower does for his trees, the better he will understand their needs, and the greater will be his rewards. I have advocated the cultivation of orchards partially with this purpose in view, if induced to take this much trouble with his trees, he will soon learn to take more, and thus on till he is a skilled orchardist; but if encouraged, directly or indirectly, to neglect his trees, he retrogrades.

But I suppose you have been preaching this necessity for the whole eighteen years of your existence; yet, as a general thing, no portion of the farmers domain or no crop raised receives such indifferent and vacillatory treatment. But a judiciously managed orchard will pay.

Mr. Darlington, of Bucks county, states that the owner of a small farm in his county sold his apple crop this year, at home, for $1,200, and it was said the dealer who bought them, doubled his money on them. Other neighboring farmers had done nearly as well.

Experience is confirming fruit growers for market, in the judgment that a very few varieties, with well established reputations, is what they should plant for profit; particularly is this the case if their location is so distant from market that their crop has to be wholesaled to marketmen or dealers. And, perhaps, the standard market apple of eastern Pennsylvania, is the Smith's cider. For a further variety, the Red Astracan, Smoke-house, Hayes, Red Romanite, Wine sap, and Newton pippin. For more northern or western counties, the Maiden's Blush, Gravenstein, York Imperial, Northern Spy, and Baldwin.

Pear culture is making slow progress. Amateurs planted too many varieties, and the failure of the great majority, from various causes, brought discouragement. When we had scarcely learned what to plant, that terrible scourge, the blight, added still more serious discouragement.

At best, the culture of the pear is more difficult. They are less adaptable to all kinds of soil and situation than the apple. Are more subject to disease, and require more careful treatment, a better manuring. Orchardists will have to better understand the manurial wants of a soil, as applicable to trees as well as farm crops, before they can grow trees and fruit entirely successfully.

Experience has entirely proven, that it does not do to affirm, that, because a wheat crop requires so many pounds of potash and so many of phosphoric acid and nitrogen that, therefore, we must apply these things in that proportion to secure a good crop. Some of these may already be in the land in sufficient quantities, and this can only be ascertained by actual experiment, and so it is with our fruit trees Different soils and different trees will require different fertilizing applications. It is our duty to ascertain these—every individual for himself. I think it is an axiom, that we cannot well get away from, that the more vigorous and healthy we can have our trees, the better they can withstand the attacks of disease of insects and of unfavorable climatic influences.

It is true a healthy tree may be attacked and injured by some contagious or prevalent disease, &c., just as a hearty man may be so attacked; but the peril will be the better withstood in the one case as in the other. It may not do to say that a rampant growing tree is necessarily healthy, or in its best condition; just as a fat man may not be healthy; but give a growing tree convenient access to an abundance of suitable food, and nature will see to it that it is healthy.

Our experiments on the State farm indicate that mineral fertilizers are valuable, both for cereals and fruit trees. The latter showing from such dressings an improvingly healthy and good bearing condition, though not entirely blight proof. This blight, in its various forms, is quite likely the immediate result of fungus growth of some kind, but the predisposing cause comes before that, probably from a weakened constitution from various or unknown causes.

I had hoped the microscopist of the State Board of Agriculture, Doctor Leffmann, would have thrown some light on this blight subject, and to this end sent him several specimens of blighted portions of trees, showing the different forms in which it appears; but he failed to make any satisfactory investigation.

We have tried the various washes suggested by members of this Society, such as white-wash and sulphur, linseed oil and sulphur, alkaline washes, &c. They were all, more or less beneficial, but none of them specially so.

No new varieties of pears have been reported as specially commendable.

The older sorts, such as Doyenne d'Ete, d'Anjou, Buffum, Bartlett, Seckel, Lawrence, &c., are still most popular and suitable for general planting.

Cherries,

Especially Early Richmond, or other sour or pie cherry, were spoken of as doing well and being a profitable crop. The finer sweet cherries rotted, as is their custom, except when the weather is particularly favorable, an occasional fine crop of Bigarreau are secured, but are too difficult to market to be profitable. Even the Early Richmond, this season, ripened too hastily with us.

Peaches

Are growing in favor in different sections. In portions of Chester county quite large orchards are being planted, and those fruiting have paid an encouraging profit. The yellows are not so prevalent, and the borer better understood. Fruit from the better varieties of late kinds, when the trees have been well handled, sells at wonderful prices.

Crawford's Late, Old Mixon, Stump the World, and Mountain Rose, were specially mentioned.

Plums

Are still spoken of discouragingly, on account of the curculio. The Wild Goose is a great grower, and the fruit might withstand the curculio, if the tree would only bear.

Grapes.

The reports are quite conflicting about grapes. From some sections we hear reports of good crops, but, as a general thing, has not been profitable. They too frequently ripen imperfectly, and are predisposed to rot and crack. This was noted as particularly the case with the Christine.

Old vineyards and old vines were frequently subject to leaf blight, or premature leaf dropping. It is suggested that, as a well cared for vineyard soon comes into bearing, it might be well to renew the vines more frequently, or plant on other ground. The Concord, Christine, Clinton, Hartford, and Ives, and among the newer ones, the Martha and Lady, were spoken of.

Berries.

The reports on berries were also unfavorable, the yields having been seriously affected by unfavorable weather. Several correspondents spoke of the difficulty of marketing many berries from many sections of the State.

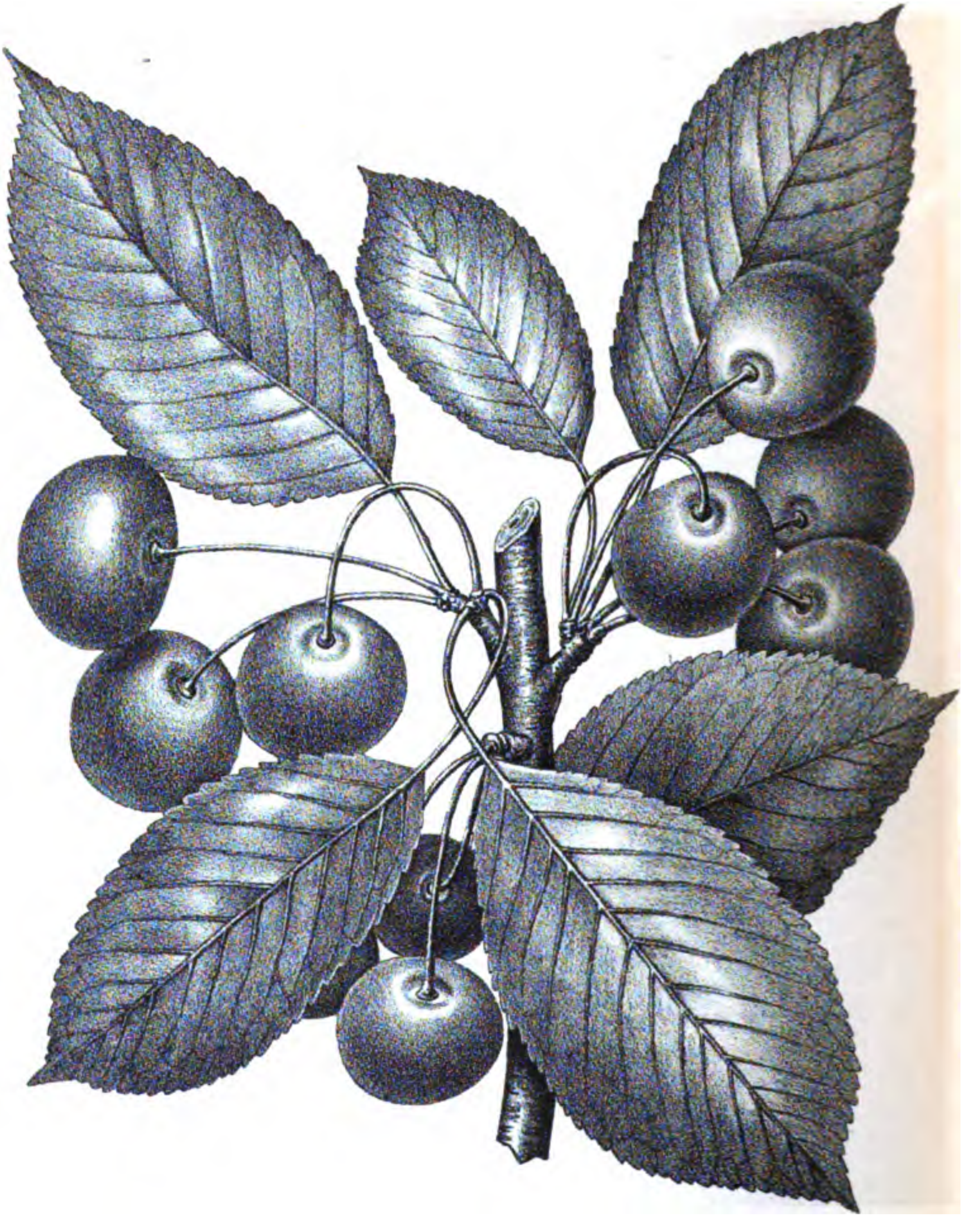
I will close this too lengthy report by giving a synopsis of the report of the secretary of the State Board of Agriculture, who gives the average per centage of the yields of fruit in this State, as reported by his correspondents:

Apples, twenty-nine; peaches, thirty-eight; pears, sixty-two; cherries, sixty-six; grapes, eighty; berries, seventy-two.

Respectfully submitted for the committee.

JOHN I. CARTER,
Chairman.

The report was accepted without discussion, and ordered to be printed. Next in order was the



LANCASTER CHERRY.

PRESIDENT'S ADDRESS.

Once more, gentlemen of the Pennsylvaniania Fruit Growers' Society, we have been permitted by a beneficent Providence to meet in our annual convention, and relate our individual experiences of the past twelve months, so that others may reap the benefit of our successes, and avoid the causes of our failures. With each succeeding year are we not made painfully aware of the limited amount of knowledge we possess, and of the great store-house of facts into which we are only permitted to enter after the most laborious work? The most experienced member of this association, even if beyond the allotted age of man, has but reached the threshold, as it were, of the study of horticulture, and is amazed at the limited amount of knowledge he has gained throughout his many years of practice in the orchard and garden.

It is only the ignorant and egotistical who presume to be teachers in this science; those who are really the most competent to act as instructors, are generally the most diffident in regard to their knowledge. Therefore, my friends, we do not presume to come among you as teachers, but rather as students in the great school of nature, expecting and desiring to receive quite as much as to give. This association has been termed an itinerent minister, going from place to place, preaching the gospel of good fruits and beautiful flowers. Perhaps, it may be true. I sincerely hope it is, although sometimes skeptical as to the results. Like the hackneyed quotation from Dickens' fertile brain, Oliver Twist-like, we ask for more. We ask that those who believe they have been benefited by our efforts, may in the future encourage our labors by their presence as well as by their words of experience. We need more earnest workers. Interested, silent, co-laborers form pleasant memories, but never accomplish greak works. We thank them for their attendance, but cordially invite them to participate in our discussions, not only at this time, but in future years, wherever we may go.

This association, as the most of you are aware, was organized "for the advancement of the science of pomology, and the art of fruit culture generally," but within the past few years its scope has been greatly enlarged, so that it embraces at the present time every department of horticulture. In my remarks this evening, I purpose giving precedence to the art and practice of

Fruit Culture,

not only in view of the valued character of the subject, but in deference to the original work of our Society. Allow me in the first place to sketch the too prevalent farmer's orchard of Pennsylvania, and I doubt not that such may be found everywhere else as well.

The old orchard planted by his father, most likely in his younger days, is on the wane. The crop of fruit, wormy, and knotty, and unpalatable, almost refused by the swine, is about to be gathered in. This reminds him of the necessity, as it has time and time again, of setting out a new plantation of trees. But unlike his former pledges in the autumns that have past, he firmly entertains the conviction that delays are dangerous; so, from fear that his newly formed resolution may once more be dissipated, he hastily settles upon a spot of ground, notwithstanding it is in sod, scoops out the necessary number of shallow little holes, and repairs to the nursery for his trees. What varieties he needs has probably never once entered into his calculations. He has heard of the Grindstone, the Carthouse, the old Gray House, with, perhaps, a few other local sorts, and here his information ends. "Apples are apples, anyhow," and he has no time to worry his brain over the competitive merits of a long list of modern varieties. He purchases his trees at last, wondering, however, what an expensive luxury tree planting is.

His trees are thrown into his wagon, without protection of any kind, and upon reaching home are at once distributed over the would-be orchard, each by the side of one of the aforesaid shallow basins, called, by courtesy, holes, which is destined to be its final home, alike its cradle and its grave, with a very short interval between. Should there be no other work pressing, the planting process will commence at once; but should there be any farming operation requiring attention, the ill-fated trees will lay until the other work is completed. With the hired help to hold the tree, the soil is hastily thrown in on the poor, cramped roots, and, perhaps, a hasty stamp on the surface is given as an additional incentive to success.

Staking the trees is entirely too much trouble, so they stand alone as best they can. The soft earth around their bases, after a heavy rain, allows them to swing about in every direction, making, as it were, capital illustrations of the learning tower of Pisa. Should the grass have "run out," the orchard will, in all probability, be plowed during the ensuing spring; but, if not, it will never pay to ruin a fine prospect for hay, simply because some people say young trees require to be cultivated. And so it goes on to the end of the chapter, and it is very often an exceedingly short chapter, too.

The many blank spaces which, in a few years, become painfully apparent, tell the tale more plainly than any words of mine can possibly depict.

And what may I say of the shattered ranks left standing as monuments of ignorance, and something, perchance, that may not merit so excusable a name? I have seen just such exhibitions of planting as these; where the suckers from the base showed unmistakable evidence that the destructive "borers" were having it all their own way; where the mosses and lichens were luxuriating upon the trunks and larger limbs that had never received the least attention since the trees were planted; and where the yellow, sickly foliage indicated, beyond the shadow of a doubt, that their careers were about drawing to a close.

Have I owerdrawn this picture? Have not every one of you observed the prototype of this ideal orchard?

Although, with a feeling of regret, I am forced to declare that I have noticed too many just such exhibitions, over and over again, and to eradicate this very evil was our society conceived; but, whether it has, even in part, fulfilled its mission, I am not prepared to say, although, hoping that the good seed sown may, at no very distant day, ripen into a plentiful harvest.

Let us for a few moments turn to a brighter picture, one bearing the impress of refinement, study, experience, and profit. The intelligent fruit grower of to-day, prepares the soil for an orchard a year in advance, and the preparation is, by no means, superficial, as the future needs of his trees are borne in mind, and a thorough foundation laid in advanee of the planting. Whether the removal is performed in autumn or spring, is of little moment to him, in comparison with the essential requirments of the work itself.

The site for the orchard is carefully considered. The proper aspect, the most suitable soil, the sheltered position, and the need of draining are, in his estimation, questions of vital importance, and, by no means, to be hastily solved. The next consideration is that of varieties, and right here is where the great blunder is too frequently made, even by those of large experience. Our careful orchardist, understanding that fruits have their preferences, selects only such that he knows, by practical tests, to be adapted to his soil. The splendid specimens grown in other States, with a climate differing from his own, have no temptation for him. His list, carefully and thoughtfully prepared, is adhered to and purchased. Extra-sized trees and extra-sized roots are his abomination. He leaves such as these for the many deluded victims of some unscrupulous dealer in high-priced stock. Would you learn how his ground has been prepared, for prepared it has been this many a day—even for six months in advance. During the previous spring, it was deeply stirred, manured, and cropped with potatoes and other culinary vegetables; but not sowed grain, for right well is he aware that this is the orchardist's bane. When planting time arrives, early in the autumn, his soil is again deeply stirred, and the tree rows marked out the required distance apart, each way. As the entire area has been so deeply stirred that it may be considered one vast hole, the question as to the size of each excavation is of little moment. The diameter and depth must depend upon the extent of the roots, and very little extra space need be allowed in digging.

Before the trees are set, he heads back the previous season's growth, at least one half their length, and when the roots have been badly injured, the cutting is still more severe. Our planter, not being a member in good standing of the kid glove gardeners, believes that there is no utensil so beneficial as the hands for working the mellow soil among the small rootlets, and this he attends to with a pertinacity worthy of success, and the result proves that he gains his point. Not a tree is set deeper than when it originally stood in the nursery row. Aware of the fact that trees like animals may be smothered to death, he gives the roots a chance to be near the surface of the soil, erring if at all, on the shallow side of the question, and contrary to all the old-time doctrines, he tramps the soil as firmly as he possibly can. His theory is this: that every rootlet should be in contact with the surrounding soil, and not the least vestige of space capable of containing air should be left in their vicinity.

Staking, which is of the greatest importance, he would not think of omitting, and to prevent the bark from being injured, he drives the support horizontally, and uses a strong straw band for tying it fast to the body of the tree, after having given it a turn around the latter to prevent rubbing.

He finishes his work by mulching the surface of the soil around each of his trees, and then carefully maps out the whole plot in his memorandum book for future reference. This performed, he removes the wired labels before they have an opportunity of cutting through the limbs.

So much for the two extremes of orchard planting, and although many of you may differ with some of my progressive tree planter's ideas, still there can be no doubt that his practice is true to nature in the main, and so I leave him for the present, and pass to the more ornamental features of our country homes.

Ornamental Trees.

Taking for a text the positive declaration, that there is no one so poor but that he can plant a tree to shelter the spot he may call his home, I wish to invite your attention to a few essential facts that play a very important part in the operation. I am not here to propose any startling theories, neither have I made any remarkable discoveries in the practical system of ornamental planting, but my desire is to disseminate information among those who have in the past paid but little attention to this refining pursuit.

The soil and climate of Pennsylvania is well adapted to the growth of certain species of trees; but, unfortunately, not at all suited to others. This knowledge may not be learned from books; it is a question of close observation and experience. Whilst the foliage of the European Horse Chestnut, with us, will present an unsightly, scorched appearance during the latter part of summer, at the same season, further north, it will be deep green, and healthy to a remarkable degree. The graceful laciniated form of the White Birch, notably so beautiful around Rochester, New York, becomes, with us, an open straggling specimen in a very few years. Who has not noted with pleasure the gorgeous appearance of the Mountain Ash, when loaded with their brilliant masses of fruit, further north? And yet, the terrible "borers" will destroy our trees before they are old enough to bear.

They, too, rejoice in numerous varieties of the Hawthorne, made famous by the old English poets almost from time immemorial, and yet, the frequent visitations of numerous species of fungoid parasites cause the branches to blight, and so disfigure the trees. Such are among the many adverse circumstances of our location, and yet we should not complain, for have we not many others equally as beautiful as they? We have the Magnolia, the queen among flowering trees, of indisputable hardiness here. Beeches, with foliage not unlike elegant ferns, or as if dyed a brilliant blood-red color, or crisped like the ringlet willow, or with branches drooping gracefully to the ground, the perfection of a "weeper." Then again we may enjoy the Maples to our heart's content. Commencing with the Norway, which I consider the standard by which all other trees are to be classed, we have, also, the Sugar, one of the best of street and lawn trees; the Silver, for immediate effect, (and beautiful, too, when constantly pruned for a few years,) its elegant new variety called the "Wier's cut-leaved;" not forgetting the charms of our Swamp or Red Maple, especially when clothed in the autumn with its brilliantly tinted dress. We have the stately Oaks for our grounds of large area; but how very few of us use them to any extent; and yet, without a defect, the members of this genus combine all the requisites of a first class ornamental tree. In fact, whether for shade, or shelter, or timber, or picturesque beauty, they are equally reliable, and of the greatest value. Nor must we forget the Lindens, with their umbrageous shade and fragrant flowers; nor the European Larch, with its grace of form and regularity of outline; nor the Bald Cypress, with its wealth of feathery foliage, and formal habit of growth; nor the unique Salisburia, with fan-shaped leaves, and smooth, clean bark; nor the rapid growing Paulownia, resplendent with purple odorous bloom; nor the Sweet Gum, odd, yet attractive, golden in the autumn, yet beautiful always; nor the Sour Gum, glossy in summer, and dazzlingly brilliant later in the season.

Especially are the Evergreens the Coniferæ of the botanist, entirely at home in our midst; and here I am always tempted to wander from my text, as from my boyhood days, their study has been my duty and delight. It has grown with my being, and in my later years has shed its happy influence upon my daily path in life. During my travels, at home or abroad, the old sense of companionship constantly steals over me wherever I chance to meet a familiar species, something akin to that experienced when grasping the outstretched palm of a near and dear friend. They seem gifted with almost human perception, the nearer I penetrate into their inner life, and, as if thanking me for my friendship, show forth from their hidden recesses many a curious tale of nature's choicest work.

Experience has taught us that our own good Commonwealth is the adopted home of the evergreen family, at least. Situated as we are in the range of country that divides the flora of the north from that of the south, our success with many doubtful species should not cause surprise. Whilst a few miles further south, the Cryptomeria, the Deodar Cedar, the Libocedrus, and other tender evergreens will succeed quite satisfactorily, on the other hand our section of country is really the southern limit of the strictly northern species. Of the class of conifers termed half-hardy or doubtful, we may, by a judiciously selected location, grow them well for at least a few years, and occasionally for a long time.

English horticulturist have frequently remarked the richness of foilage and perfect freedom from disease that so universally accompanies this order of trees in the Middle States, and although the native species of our Pacific coast succeed well in Europe, yet, to use the expression of a prominent English arboriculturist, we would gladly exchange with you, could such a transaction be possible.

I want to caution all of our planters against setting first-class trees in third-class yards. No greater mistake is made by our people than this very error of judgment. The Norway Spruce and Norway Maple are exceedingly handsome, and I cannot blame any one for wishing to possess them, but the extent of ground must decide the question of appropriateness. If you err at all, do so on the side of too few trees rather than too many, as a small yard crowded with trees and shrubs shows to greater disadvantage than if it contained but one or two fine specimens.

Treat them with as much consideration as you would your garden vegetables, and not foolishly think that your trees require nothing more than the simple act of planting. Well formed trees, dense and perfect in outline, are by no means invariably the rule. Many species are difficult to train properly, and only grow luxuriantly when treated with great care. A limb tied down here, another removed there, and a third pinched back, will in time cause the most unruly specimen to develop into a beautiful tree; but should it be "severely let alone" for a number of years, cut and train it as you may, it can never be converted into an attractive object. What must be remembered in this connection is the sage old truism, "Just as the twig is bent the tree is inclined."

Should your trees not grow satisfactorily, do not forget to feed them; they can no more brook neglect than your Alderney cow and Southdown sheep. Give them wholesome, nutritious food, in small but frequent applications. Rich, stimulating manure, in unlimited quantity, will lay the foundation of some devastating disease; but phosphates, bone dust, thoroughly decayed compost, &c., will intensify the color of the foliage, and induce a strong, healthy growth. Before closing my remarks upon trees, perhaps I may be pardoned for making a few remarks upon the now popular subject of

Forestry.

I invariably approach this department of arboriculture with extreme caution, somewhat on the principle of the proverbial Englishman, who gave the land tortoise a wide berth upon first acquaintance. "He may not harm me," said he, "but as I cannot see that he will do me any particular good, we will just take different paths."

I own that I am in the minority on this subject, and possibly a very small minority, too, but I have never yet been able to appreciate the virtue and efficacy of the prevalent belief in indiscriminate tree-planting for timber. I admit there are many sections of country where land can be purchased very cheaply, on account of its unfitness for agricultural pursuits, and such might be made profitable by planting to timber. I say *might*, because, no matter how plausible the fashionable theories on this question may sound, we, as Pennsylvanians, are too fully aware of the many thousands of acres, in our State, now covered with the finest forest growth that the world has ever seen, to be infected with a timber mania. But says the advocate of some pet scheme for rapidly accumulating a fortune out of this belief, "These forests are rapidly disappearing; and what then?" My answer would be, Yankee-like: "And so are the coal fields, &c.; but has the price of lumber increased very much of late years?" In fact, is it not now lower than it has been for a long time? When our vast forests have become sufficiently exhausted, so as to make it an object to raise young trees, and that, too, upon land convenient to good markets, then will it be time to engage in the forestry business, but I fear it will prove a losing speculation before.

I make these remarks in all sincerity, and with no desire to discourage the planting of trees.

Far be it from me to throw the least obstacle in the way of any one who desires to engage in so laudable a pursuit, in a proper way, and for a reasonable purpose. My earnest desire is for every one to beware of the theoretical reasoning that may warp the judgment, and thus prove a financial source of trouble to those who may engage in the business of forest-planting, without due reflection. The question of

Flowers

is one that may not be passed over without due consideration by our Society.

I am well aware that there exists to-day, as it always has existed in this country, a deep-seated yet unwarranted prejudice on the part of many against the adornment of our homes, therefore, as a part of our horticultural duty, in accordance with the requirements of our Constitution, we should endeavor to eradicate this belief, and in its stead create a love for the beautiful in nature. I have already given my views upon this subject upon more than one occasion at our annual meetings, and shall, therefore, not dwell upon it now for any length of time; but I desire to encourage every one to possess at least one bed of flowers, and during the long winter days adorn the windows with one or more flowering plants. Addressing myself to the owner of small door-yards, as in the matter of trees, here too let your wants be few. Never attempt an extensive and complicated design upon a limited space. A very small bed of flowers, neatly arranged, will create a far better effect than a long narrow border or several beds jumbled together without taste or system; and just here allow me to call your attention to the value of a well kept turf.

The modern lawn mower, in my estimation, has accomplished more good than any other implement in use on our cultivated grounds. It eradicates the weeds, thickens up the turf, and by returning to the soil the refuse clippings, imparts a rich dark green color to the lawn. Very few of our gardeners understood the use of the old-fashioned lawn scythe, and consequently very few handsome lawns were to be seen. The expense entailed by the frequent cutting to preserve a clean velvety appearance, deterred almost every one from attending to this duty as often as it was necessary, therefore, long grass was very generally the rule instead of the exception, as at the present time, in every well-regulated place. In selecting plants for our beds, are we not drifting too far from the old styles of gardening? Or in other words, are we not ignoring the claims of our many beautiful flowering plants for that class whose only merit is its brilliant foliage? I am aware there is much to be said on both sides of the question, but for plain, simple gardening, in limited grounds, my advice is to use the bright-foliaged plants, with extreme caution. With the possible exception of the Geranium, there are few flowers to be seen in the majority of our larger places, as the modern styles of ribbon-gardening and carpet-bedding, as they are aptly termed, will not admit of any plant whose beauty flags for a moment, and there are few species, but what will take a season of rest sometime during the summer months. The old mixed beds had at least one merit that should claim proper consideration at our hands, and that is by embracing a great variety of plants in one bed, without any specific sys-system of arrangement, there was at all times something in bloom, and the combination of colors was generally attractive, provided some little tact was exercised in using plants of stronger growth for a background, and the dwarfer kinds at the front. The modern system of sub-tropical bedding is highly meritorious in one point at least, for it has taken the very plants that our ancestors used indiscriminately and without any taste whatever, and by simply grouping such together in a proper locality, has converted into objects of beauty plants which in former years served only to remind us how remarkably coarse they were.

The Sunflowers and Castor beans, that flaunted their huge leaves along the garden fence during our boyhood days, are excellent examples of this character. Time and other questions warn me I must leave this, to me, fascinating subject, although I am aware I have not done it simple justice.

Natural Science.

One of the greatest benefits to be derived from an association such as this, is the lesson that may be learned from those among our members who have paid especial attention to the several departments of natural science. Each of these specialties exerts a wonderful influence upon the practical duties of horticulture, and explains many of the mysteries that we, as a class, are working in the dark to guard against.

What makes the humiliation yet more acute, is the fact that too many are disposed to ridicule the scientist in his work, and treat his explanations as the visions of an idle dreamer, or as the emanations of an egotistical mind. But the truth is the very reverse. The more intimately we become acquainted with the beautiful operations of nature, and the wonderful influence they exert upon the most common of our daily tasks, the more anxious we become to acquire additional knowledge in all that relates to the higher branches of scientific research. So far as botany is concerned, (the department of natural history, that probably exerts a greater influence upon horticulture than any other,) there can be no reasonable doubt in regard to its efficiency and usefulness in all our gardening operations. The words of Cicero, the great Roman orator, are very applicable here: "These studies are the intellectual nourishment of youth, and the cheering recreation of age; they adorn prosperity, and are the refuge and solace of adversity; they are pleasant at home, and are no incumbrance abroad; they abide with us by night, go with us in all our travels, and lend additional charms to the attractions of our rural retreats."

Whatever may have been the inducement to acquire botanical knowledge, it is beyond question that, when once gained, the possessor invariably feels that he has been amply re-paid for his toil; and as the years roll on, and the practical character of the pursuit gradually yields to the æsthetic, he perceives more clearly the wonderful power than planned the entire system, and how carefully and wonderfully the most unimportant parts have been constructed. Said the late Doctor Darlington, the eminent botanist: "There is a calm delight in the contemplation of plants and flowers, which is never felt, and can never be appreciated, by those who find their chief gratification in the turmoils and commotions of the animal world. The disposition of man derives much of its character from association, and external impressions; and it is, doubtless, partly owing to the bland influences of a rural life, that enlightened agricultural communities are less prone to those cruel excesses, which so often disturb the artificial and struggling society of crowded cities." The researches of the naturalist are by no means confined to a single channel.

The bestowal of technical terms upon the trees and plants themselves, as well as upon their individual parts, is but the means to accomplish a certain end. He looks far beyond this. The plant's structure; its life-work; the ills which befall it; and the uses to which it may be applied, are all rounds in his ladder of knowledge, every one of which wield a powerful influence upon our duties in the farm and garden, treat them as slightingly as we may. The practical value of an intimate knowledge of plants becomes at once apparent, the moment we turn our attention to the subject of pernicious weeds.

Again: quoting from Doctor Darlington, "The man who does not know the more important plants by which he is surrounded—whose eyes has not learnt to discriminate their character—is deficient in one of the primary qualifications of an enlightened cultivator of the soil." As it is not my intention to detain you too long a time this evening with my discursive remarks, I shall now ask you to consider the

By-Laws.

Of our Society, as they are at present framed. The field of labor in which we are now engaged, is so large, and embraces such a great variety of topics, many of which the founders of this society never entertained, that I have thought it would be wise to reconstruct them, so as to meet our present necessities. We are no longer, as our name would imply, simply growers of fruit; but we have to consider all the more important topics embraced within the term horticulture.

True, at a former meeting of this Association, the power to form new committees was placed in the hands of the Executive Committee, but the plan would be far more effective if sanctioned in an orthodox manner by the authorized rules, and printed in our annual reports.

The General Fruit Committee is the only one that has each year made a report to our meetings, and I believe it has accomplished great good, notwithstanding the discouragements it has had to encounter in obtaining the desired information. But there is no reason why we should not receive an annual notice of the injurious insects, with suggestions for their destruction. We need more light upon the puzzling subject of diseases of trees and plants, and their remedies, so that a committee, composed of gentlemen who are competent to give advice, might accomplish great good in this particular field. Then again, the subject of ornamental and forest trees is one deserving of study and research; and here, too, the value of our Society would be greatly enhanced by carefully prepared annual reports. The cultivation of flowers, in all its various branches, is, or at least it should be, one of the most popular studies of our common pursuit, and this might be rendered very entertaining, as well as instructive, by having prepared yearly reports on the newer plants, with lists of the older kinds best suited to the wants of our people at large. The proper arrangement of these in beds should not be lost sight of, and their propagation and training are also subjects of importance and interest. The vegetable garden, both for market and home use, appeals to our aid for help. As too frequently seen, it is overgrown with weeds, and the crops weakly in growth, consequently they rarely pay the owners, and judging by the character of the varieties too often selected, a few suggestions in regard to improved forms might be beneficial. Improved systems of preserving winter vegetables is also a topic of great interest to every owner of a garden, so that this feature should certainly be borne in mind.

The Committee on Nomenclature is still engaged upon its work of collecting valuable information in relation to our seedling Pennsylvania fruits. It expects to record all such intelligence for the use of our members, and to assist in carrying out its designs, copies of our annual reports for 1871, 1872, 1873-4, are much desired. New varieties of seedling fruits having only local reputations may be forwarded to the chairman of the Committee on Nomenclature, who will carefully test and note their merits. When a variety promises to be especially valuable, a drawing of the same will be made and engraved. We, as Pennsylvanians, are justified in cherishing a pardonable pride that our State has furnished so many varieties of fruits of the highest quality and value, some of which rank not only among the most popular kinds at home, but their characters are rated best when grown on foreign soil.

Concluding Remarks.

In closing my remarks, I desire to express my sincere thanks to you all for your attendance here at this time, and to hope that you will feel amply re-paid for the visit.

There are in attendance many gentlemen of large experience, who, in their various horticultural specialties, are unsurpassed as instructors, so that I see no reason for doubt, in regard to the interest of our deliberations. We meet, for the first time, in a section of the State almost unrepresented by our Society, but we trust that the future may tell a different tale, and that a locality such as this, where can be raised such good fruits and beautiful flowers, should furnish its full quota of delegates to our future sessions.

It has been said of these meetings, and fitly so, too, that there is an element of sociability accompanying their business character, which exerts a refining influence over our natures. draws us more closely together, and softens the asperities that will almost unavoidably, at times, creep into our discussions. This social, friendly element should, therefore, be cherished and cultivated, so that we may look forward to our coming meetings, as among the brighter phases of life's journey, nor be disappointed in their realization.

There are those among us who have, from the first, adhered closely to the best interests of our society through good and evil report, who, when all hope seemed lost, when nothing short of a miracle could save our Association from dissolution, these gentlemen, with renewed interest, once again placed it upon a useful basis, and to-day have the pleasure of seeing the Pennsylvania Fruit Growers' Society as useful and flourishing an association as any similar one in the country. Without ostentation or boasting, it has kept on the even tenor of its way, working zealously for the public good, its members bearing the burden imposed upon them uncomplainingly and cheerfully, until, in its own quiet way, it has almost unconsciously raised the—shall I say science?—of horticulture to a higher standard, in our State, than it has ever before enjoyed.

Yes, horticulturists of Pennsylvania, I may compliment you upon the manner in which you have performed your self-imposed duty; and, in all truth, I can declare, that no body of men, for any purpose whatever, has ever been drawn together in convention, whose arguments and deliberations have been conducted in a spirit of more conciliation and brotherly kindness than your own. And as I look around me, and note so few of the familiar faces that were gathered together eighteen years ago, when this society was ushered into existence, I wonder, within myself, whether or not there will be others to rise up and take their places, when these shall have passed away. As year by year lessens the number of the little company that laid the foundation of our now flourishing Society, I know you will all unite with me in the heartfelt desire that the services of a Meehan, an Engle, a Harvey, an Evans, and others, may be preserved to us for very many years to come, and I am well assured, that the future horticulturists, who may be called to take their places, will have just cause to abundantly thank them for their unselfish interest in the cause. What the most experienced have acquired, by diligent and patient work, is within the province of us all to gain as well, provided the same amount of energy shall be devoted to it; and those of us who may be permitted to enjoy the green old age of life, when the physical powers are no longer sufficiently strong for us to engage in the active duties of the orchard and garden, there still remains the satisfaction of looking back over well-spent lives, and recalling the many pleasant reminiscences connected with our vocation, so that with Sprague, the botanist and poet, we, too, may say:

"I breathe the summer air!
I wander in the woodland paths once more!
Again the copse, the dell, the meadow wear
The loveliness of yore.

"The friend who, in those years,
Shared warmly in my rambles far and wide,
Back, with the same old fondness re-appears,
And trudges at my side."

It now only remains for me to add that I thank you heartily for your kind attention to my remarks, and that my warmest wishes are, that your brightest anticipations may be fully realized in all your daily avocations; not only in the several departments of a thorough horticultural life, but in the various other duties, which, to a greater or less degree, are incumbent upon us all.

'At the conclusion of the address, and on motion of Mr. THOMAS, of West Chester, Mr. S. B. Parsons, of Flushing, New York, was elected an honorary member of the Society.

President HOOPES called attention to the fact that President Calder, of Pennsylvania State College, could not be with us after the morning session. Hoped, therefore, to hear from him now, on the subject assigned him:

"HORTICULTURAL EDUCATION."

Mr. CALDER regretted his inability to remain, but duties at the college necessitated his leaving after the morning session. After hearing the excellent essays by Mr. Parsons and Mr. Hoopes, it hardly seems in place to add anything further. Must say that a love of horticulture is refining and beneficial. It is evident, to even the most casual observer, that the care and study of flowers and fruits is elevating. The poor, who have not the means to gratify such tastes, still enjoy the flowers and the landscape.

The horticultural and floral display at Philadelphia, during the centennial, was a grand one, and reflected great credit upon those having it in charge. No one who had an opportunity to witness it could do so without being benefited. In the year following, (1877,) we already noticed that some had gone to work, with good results. Have seen evidences of it in our grange grounds and surroundings.

Much credit, also, is due our horticultural papers and periodicals. They are doing a good work, in disseminating horticultural knowledge, as well as elevating the public taste in that direction. They deserve a much more liberal support than a majority of them receive.

Referred, also, to the flower missions that were organized in some of the cities, and the good they are accomplishing. Many cases of sickness and distress have been alleviated by bouquets or blooming plants. They cheer and encourage the sick and needy, both by their beauty and the evidence they give of a kindly interest on the part of others. Related an instance, where a family with an invalid child had been visited by a benevolent lady, who presented some flowers. At first she saw no evidence of neatness nor good housekeeping. Subsequent visits showed that, in order to benefit the flowers, the windows had been cleaned, and more light admitted. This, of course, was an advantage to the invalid also. It also showed the bad condition of the furniture, and induced the drunken father to make some repairs. This led him to remain with his family, instead of spending time and money in drinking. Thus, gradually, a once desolate home was made cheerful, and the general condition of the family much improved.

But while horticultural displays, periodicals, and flower missions are doing much for horticultural education, we must look to our schools as the means of cultivating a general taste and knowledge of horticulture among the people. Let us introduce the study of horticulture into our common schools. Teachers might give instructions how to take care of house plants, and how to propogate them by seeds and cuttings. Exhibit injurious insects, and show how to destroy them. The elements of botany might be taught, and more advanced scholars could be taken to the fields and woods for practical instruction. Some would, from the beginning, show more interest in these branches than others, and they should be encouraged to go forward. Then the grounds adjoining our public school buildings should be made attractive by planting flowers and shrubbery. Such a course would have a beneficial influence upon the entire community.

At the State college we have a flower garden, in which all have an opportunity of acquiring a practical knowledge of the care and cultivation of flowers. As a result of the growing taste for floral decoration, on the the part of the students, I might add, that I counted, lately, sixty-five windows in the front of the college buildings, in which plants or flowers were displayed. The institution is in need of green-houses, and other aids, to floriculture, which we do not yet possess. We will have young men at college, qualified to take charge of grounds, soon as we have the proper facilities.

Committee on nominations submitted the following list of candidates for the several offices for the coming year:

President.

JOSIAH HOOPES.

Vice Presidents.

M. M. ENGLE,
A. R. SPROUT,
JOHN I. CARTER.

Recording Secretary.

E. B. ENGLE.

Corresponding Secretary.

W. P. BRINTON.

Treasurer.

GEORGE B. THOMAS.

Mr. SMALL, having declined a reëlection, Mr. A. R. Sprout's name was proposed. On motion, the list of officers was so amended, and elected as amended, by ballot, the Treasurer being authorized to cast the ballet for the society.

Mr. CHARLES H. MILLER inquired whether the constitution of the Society permitted the election of but three Vice Presidents. Hoped there would be an opportunity of electing twenty-five instead of three. Thought a larger list of officers would have a good effect.

Mr. ENGLE agreed with Mr. MILLER as to the propriety of having more Vice Presidents, at least. The American Pomological Society has one vice president for every State in the Union. Thought it would be well for this Society to have one for each county represented.

Mr. MEEHAN considered the idea of having each county represented a good one, but thought the General Fruit Committee might be so constituted as to answer the same purpose.

Mr. ENGLE hoped other members would express themselves on this subject. No final action could be taken by this meeting, as the constitution would require amendment. Submitted, therefore, the following amendment to the constitution for adoption at our next annual meeting:

Resolved, That the constitution of this Society be so amended as to allow the election of one Vice President for each county represented in the Society.

Mr. MEEHAN being called upon for remarks, responded briefly. Was much interested by the reading of the President's address. In reference to the proper fertilization of fruit blossoms, scientific men have recently come to our aid with the results of their observations. The theory that frequent failures of fruit crops occur through improper fertilization is now pretty generally set aside. It is known that a single flower produces sufficient pollen to fertilize an entire tree. Some varieties of flowers are known to fertilize and produce seed without opening at all. It was for a long time supposed that no pollen existed in these flowers, but from ten to twenty pollen grains are found in each, and with their aid, four to five hundred seeds are produced. Single apple blossoms are known to produce millions upon millions of pollen grains. When, therefore, apple trees, that bloom properly, fail to produce fruit, it may be for want of proper nutrition, so much fruit being set, that but a small portion of it can be brought to perfection. Was also much gratified by Mr. Calder's remarks. Sorry to say, that among the higher and educated class of people there is but little attention given to horticultural education. We see no trace of it in our public buildings. We see Chinese flowers and Egyptian water lillies, but no native flowers. In our school-houses, we see no trace of any material improvement. Evergreens and flowers might be planted, lawns laid out, and much done in this direction to make schools attractive.

Mr. **ENGLE** considers this question of fertilization one of great importance. Has noticed some seasons that orchards fail entirely, while others, near by yield abundantly. Thinks Mr. Meehan's idea of deficient nutrition will explain such freaks. It seems, that although nature may do her part, there is something for man also to do, if he would succeed.

Mr. **LINT** finds failures, not from improper setting of fruit, but by rains, heat, and insects. Has prospects of good crops until fruit is about the size of a walnut, when rains often set in, and drown the fruit, or hot weather gives insects an opportudity to destroy it.

Mr. **BALDERSTON**, Maryland. If we take any plant or an apple graft, and set it in water, it will not grow. We destroy its vitality. If ground is saturated, so that a tree or plant is in stagnant water, it will soon die. Sometimes it drops its fruit to save its own life. Pear trees especially do this. It is well it is so, as some trees would soon die by over-bearing.

Mr. **SPROUT** considered this a subject of much interest. Has given it some attention, but never could satisfy himself as to the cause of early falling of fruit.

Mr. **SHOWERS** would like to hear the opinions of members on the subject of cultivating orchards. For himself, thought it best not to cultivate much. In peach trees we are apt to get too close and destroy large roots. Would not advise sod.

Mr. **BALDERSTON** has watched the effects of cultivation and non-cultivation pretty closely. When a small boy, his father had an orchard which was not cultivated, and produced no fruit. It was put in corn, cultivated freely, and produced good crops of fruit. Has now three orchards, sometimes one is in sod and the others cultivated. Has noticed that while they bloom equally, the cultivated orchard produces much finer fruit. As to the cutting of roots, in his opinion, trees have different kinds of roots. The feeders are small roots near the surface, while the main arteries are ten to fifteen inches under ground. Does not believe in indiscriminate plowing at any time, but judicious plowing at proper seasons. May be in error, but his views are substantiated by his experience.

President **HOOPES** presented the following communication from Mr. J. A. Warder, of Ohio, inclosing memorial of a committee of the "American Nurserymens' Association," and resolutions of the Ohio State Horticultural Society, which were read by the Secretary:

NORTH BEND, OHIO, *January 7, 1878.*

JOSIAH HOOPES, Esquire, *President Pennsylvania Fruit Growers' Society:*

DEAR SIR: I am rejoiced to see you have such a noble programme for your approaching meeting, and wish I could partake of the feast you propose to spread for the horticulturists who may meet at Williamsport, January 16.

I am glad to see, also, that you vary the diet, change the mental food, as we have all done in the West, expanding the area of usefulness from the orchard confines to the broader fields of horticultural research. You propose, I see, to enter even the recesses of the woods, and to have a paper on "the forestry question," upon which Fuller light is to be shed, from the office of the brilliant luminary of the *New York Sun*. Good! I rejoice, and should rejoice to see and hear. You have also a strong committee on *arboriculture*. Now, with all this array, let your old western friend come in with a request that our forestry memorial be read, and perhaps you may find it in your hearts to indorse it strongly, by way of strengthening the spine of your delegates in Congress, to whom your resolutions can be sent. Such action is being had by our western societies, and it cannot fail to have a good effect.

We are terribly ignorant of the whole matter of forestry, and we need instruction which could be furnished by a sensible hand-book, prepared by some practical man, who would thoroughly and industriously study the matter in Europe, and give us a sensible report of how they produce those beautiful and profitable forests, adapting the information to the wants of our country. What do you say?

Truly, yours,

WARDER.

On motion of Mr. CALDER, the Secretary was ordered to transcribe the memorial, and send a copy to each member of Congress from our State.

Mr. PARRY, of New Jersey, followed in an interesting and practical essay on

NEWER SMALL FRUITS.

Within the recollection of many of us, small fruits were not important in a commercial point of view.

Strawberries grown in the garden, for family use, and the surplus carried to the nearest town, was about the extent of the trade, until the introduction of Hovey's seedling, in 1834, which gave a great impetus to the cultivation of strawberries, and many persons planted them largely. Still there were certain principles not generally understood, which were essential to produce the best results. Many patches, well manured and highly cultivated, would make a vigorous growth and bloom profusely, yet the pistils would not expand, the blossoms would wither and blast, producing but little fruit. The grower become discouraged, and conclude that raising strawberries was an uncertain business.

But after the publications, in 1846, by Nicholas Longworth, of Cincinnati, of the sexual character of strawberries, and that it was necessary for the Hovey and other pistilate varieties to be accompanied with a portion of staminate plants, to impregnate them, to insure full crops of fruit, strawberries could be grown with as much certainty, and as plentifully, as other crops, and were sent to market by the wagon load, as peaches and apples had been before.

The art of growing strawberries abundantly was still more simplified by the introduction of Wilson's Albany, a hermaphrodite plant, having blossoms perfect in both organs, and wonderfully productive, large size, firm flesh, turning red before ripe, would carry a long distance to market, and look well when exposed for sale, possessing, in an eminent degree, those qualities most desired by large growers, who must transport their berries a long distance to market; and thousands of acres are now cultivated, to produce the immense quantity of strawberries which are sent daily, in their season, hundreds of miles to the large cities, New York having received, in one day, more than ten thousand bushels; and in Philadelphia, in the height of the season, as many as two hundred bushels have been thrown in the dock, in a single day, for the want of purchasers, showing that the market can be overstocked with Wilson's Albany, which are not very palatable in the condition they are usually shipped to market from a distance.

Captain Jack is a strong and luxuriant grower, healthy, and productive, berries large, handsome, and solid, somewhat resembling the Wilson, of which it is said to be a seedling, though better in quality, and increases more rapidly.

The *Charles Downing*, *Kentucky*, and *Monarch of the West* have been tested over a wide range of country, and have generally given good satisfaction, being of excellent quality, large, and productive, carry well, and sell much better than Wilson's Albany.

Prouty's Seedling, *Forest Rose*, and *Sharpless* are large, handsome berries, good quality, and very productive; and, as far as tested, are very satisfactory.

Cumberland Triumph is a very large, handsome berry, uniform in shape, productive, and commands a ready sale, on account of its fine appearance and good quality.

Seth Boyden is mammoth size, good quality, and valuable.

Perhaps, no person has given more attention to the improvement of the strawberry by cross-fertilization, or whose efforts have been attended with greater success, than E. W. Durand, of New Jersey, who now has more than three thousand distinct varieties on his plantation, among which are to be found some of the largest and finest strawberries in cultivation, measuring from six to nine inches in circumference—such as *Great American*, *Beauty*, *Pioneer*, *Black Defiance*, *Centennial*, and other magnificent fruits, which are well worthy of trial in all sections of our country.

The *President Lincoln*, a very large, firm, glossy fruit, said to have grown to the enormous size of eleven inches in circumference, on the grounds of the originator, should be allowed a wide range in other sections for expansion.

Miner's Great Prolific gives promise of excellence, and should have further trial.

Cheap Strawberries.

The demand for strawberries of good quality has become so great, that the quantity sold will depend upon the price at which they can be furnished, and any good variety, of fair size, that can be grown in large quantities, without much labor or expense for manure and cultivation, will be of great value to the producer, who must first pay all expenses attending their cultivation and gathering for market, before any profit can be realized.

The Crescent Seedling is a remarkable strawberry, more productive and more easily grown, with less expense than any other strawberry that we have seen. We were shown a plantation four years old, in fine condition, heavily laden with large, fine fruit, on which there had not been one dollar expended for manure or labor since the first year planted. The fruit is very uniform in size, between four and five inches around, of a bright scarlet color, beautiful, firm, attractive, and excellent quality; carries well, and sells better than other strawberries; ripening several days earlier than Wilson's Albany, and holds out longer, leaving a green foliage at last. The plants are strong, vigorous growers, taking possession of the ground, and holding the situation for many years, to the exclusion of weeds and grass. Having fruited it the past season, we have not seen any leaf blight, while other varieties were badly burnt with the hot sun. It must become a general favorite with large planters, who do not spend much time nursing their strawberries. They are reported to have been carried two hundred miles and exhibited, without showing marks of transportation; have yielded at the rate of fifteen thousand quarts per acre, and it is estimated that they can be profitably grown at three cents per quart, allowing one cent for picking, one for expenses of growing and marketing, and leave one cent profit, equal to $150, net, per acre, and for each additional cent per quart at which the fruit sells add $150 more profit per acre. When these facts become generally known, it will scarcely be worth while to cultivate for market, many varieties that we now have, that require the expenditure of much time and labor to keep down grass and weeds, and will not yield one fourth as much fruit, or only about one hundred bushels per acre.

Raspberries,

Ripening soon after strawberries, when there is but little other fruit in market, are eagerly sought after and command good prices.

Their extensive cultivation, as a field crop, is of but recent date.

The Native Black and Yellow Caps, and old Purple Cane, being the principal varieties that would stand our warm, dry summers, and cold, changeable winters, without protection. All efforts to acclimate the large, fine, imported varieties, such as Antwerp, Hornet, Fastolff, Giant, and others, proving unsuccessful. In 1840, a seedling raspberry plant was found growing wild in a wood, near Philadelphia, which for size, hardiness, productiveness, and other good qualities, surpassed any other red raspberry then known to fruit growers, and was christened the *Philadelphia.* It soon became a general favorite and was largely planted, one grower having more than twenty acres, and some patches yielding two hundred bushels per acre, which created a lively interest in raspberry culture. In 1866, the *Herstine*, claimed to be a cross between the Philadelphia and Allen's Red Cane, was introduced to public notice. It is a large berry, bright red color, delicious quality, and very productive in some localities, but not sufficiently hardy to succeed well generally.

The *Susqueco* (Brandywine) is a great favorite among market men, being hardy and productive, large size, firm, dry flesh, and a beautiful bright red color, bears transportation well, and commands a high price in market; one ten acre lot yielding $4,338.

The Pearl is a bright red, medium size, handsome, firm berry, bush dwarfish, a slow grower, with thick, tough foliage; needs good, strong land, and high cultivation. Having been widely distributed many years since, it may re-appear again under another name.

The Thwack created quite a sensation in Missouri; was claimed to be a hybrid between the Herstine and Brandywine, yet it so nearly resembles the Pearl, above described, as to show no marks of difference in growth of canes, foliage, or fruit.

Delaware is a large, handsome berry, bright red color, pointed like the Antwerp, and said to be a seedling from the Hornet.

Ganargua and *New Rochelle*, both originated in the State of New York, are very similar in their habits of growth, size, and general appearance of fruit, which is large, of a dark red color, canes strong growers, hardy, and propagates from the tips.

Norwood originated in Massachusetts, fruit of medium size, dark red color, very productive, hardy, propagates from tips, not from suckers.

Winant, a seedling raised in New Jersey, a strong, vigorous, upright grower, perfectly hardy, fruit large size, being two and one quarter inches in circumference, beautiful, clear, bright red, firm and productive.

Early Prolific, a seedling raised from the Philadelphia, as hardy and productive as its parent, larger, handsomer, and more delicious, and about one week earlier.

Reliance is another seedling raised from the Philadelphia, a bright red color, much larger, handsomer, firmer, and better than its parent, bears transportation well and sells readily in market, and is wonderfully productive, having yielded more than one hundred bushels per acre of fruit at one picking.

Pride of the Hudson, a new raspberry recently introduced by E. P. Roe, very large, measuring three inches around, bright red color, firm, excellent quality, and very productive; plant a remarkably strong, vigorous grower, appears to be hardy in New York, never having received any winter protection whatever, propagates from suckers, which spread but moderately. Season of ripening commences about the first of July and continues through the month.

As the plants can be obtained next April, they should have a wide range for trial.

Henrietta, a seedling found growing in Connecticut in 1871, has proven perfectly hardy, never had protection of any kind, though the mercury has been twenty-four degrees below zero, without injuring the canes. Fruit very large, some of the berries measuring three and one quarter inches around, firm, of a bright red color, carries well, fine appearance, and delicious in quality. The canes are remarkably strong, growing six to eight feet, and heavily loaded with large, handsome fruit, nicely shaded by a vigorous growth of broad, tough foliage. It should have a thorough trial in all sections of our country.

Norwalk Seedling is a bright red color, fine flavor, very firm, and solid, parts easily from the stem, and does not crumble or break in picking. Is a superior variety both for market and canning purposes.

Cuthbert, remarkably handsome, the size of the Hudson River Antwerp, of a deep, rich crimson color, firm, good flavor, rather late in ripening, at its height from July 10 to 20, and continues a long time in fruit. Canes of a strong growth, entirely hardy, and yield a heavy crop of fruit.

The Grapevine Raspberry, so named on account of the appearance of the canes and large leaves, which resemble grape foliage, an ornamental bush for lawn decoration, but of no value for fruiting.

Yellow Raspberries.

Arnold's orange. Strong vigorous canes, perfectly hardy, fruit of good size, moderately productive and of medium quality, bright color, propogates from suckers.

Florence is a cap variety, a fine yellow berry, deep rich orange color, good flavor, canes vigorous and hardy and exceedingly prolific.

Caroline said to be a cross between Brinckle's orange and Catawissa, propogates both from tips and suckers, makes very few suckers and does not root as readily from tips as the cap varieties. Fruit resembles Brinckle's orange in color, size, and quality, but firmer, perfectly hardy, and very productive, yielding two or three quarts to each stool.

Hawkin's orange, a poor fruit of no value.

Black Raspberries.

The Gregg is the largest and best raspberry yet offered for sale, perfectly hardy, strong, vigorous grower, and very productive.

Blackberries.

Of fifty varieties of blackberries that have been tested here, *Wilson's Early* is deservedly most popular for market, being early, very large, productive, sweet, and delicious. The canes are long and slender, bending over to the ground and sometimes strike root from the tips, and are propagated both from root cuttings and tips. They are not subject to the orange rust, so very destructive on the Kittatinny and Dorchester, although double or rose blossoms, which are abortive, producing no fruit, are sometimes found on them, and the canes are liable to a gald or enlargement as though bored by insects, which checking the flow of sap, destroys the fruit above the wound.

Like the new Rochelle and Kittatinny, it was an accidental seedling found growing in Burlington county, New Jersey, about the year 1850, by John Wilson, whose name it bears and by him brought to the notice of fruit growers. The centennial prize medal was awarded to this variety.

Dorchester, *Kittatinny*, *Missouri*, *Mammoth*, and *New Rochelle* are still cultivated to more or less extent.

The Wilson, *Junior*, a seedling raised in 1872, and another raised 1874, from Wilson's early, seem to possess all the good qualities of their parent. Delicious, large, early, and very productive, showing no defect yet, in canes nor blossoms, and having been started from the seed at least twenty-five years later than the mother plant, may be relied on to continue longer in health and vigor.

The Snyder, *Wallace*, and *Taylor*, three new varieties iutroduced from the West, are giving great satisfaction wherever tried. They are perfectly hardy, and very productive; never known to be injured by cold, when other varieties were mainly destroyed.

The Wallace is a strong, stocky grower, with enormous dark green leaves, earlier than the Kittatinny, larger and superior in quality.

The Taylor produces large crops of splendid berries. Best quality, and wonderfully productive, sweet and delicious, ripening about the same time as Kittatinny, one and a half inches long, and seven eights of an inch in cross diameter, or two and five eights inches around. Canes are long and slender, bending over to the ground, and sometimes striking root from the tips, but more easily propogated from root cuttings.

Hoosac Thornless, like Dodger Thornless, and Newman's Thornless, has canes so smooth and free from thorns, that it is a pleasure to handle them; but a great disappointment, after cultivating them carefully for several years, to find no fruit worth picking.

A blackberry bush, that is deficient in thorns, has never been found to produce fruit as large and fine as others having thorns.

The largest and best fruit will bring the highest price in market, without reference to the kind of bushes on which it grew.

Blackberries, for several years past, have averaged about three dollars per bushel. The require but once planting in many years, producing annually as many bushels per acre as corn, with less labor, and should be more generally cultivated.

WILLIAM PARRY,
Cinnaminson, *New Jersey*.

At the conclusion of his essay, Mr. ENGLE inquired further about the Crescent seedling strawberry. If such large crops can be grown without special care or cultivation, cannot still larger ones be grown by cultivation?

Mr. PARRY thinks it is like the cranberry, will do better without cultivation. The horse and cultivator seem to do more harm than good. Went to Connecticut himself to see this wonderful berry, and was not disappointed in his expectations. Saw a fine plot, on which, he was told, not a dollar had been expended for fertilizers and culture in four years. Never saw anything like it in productiveness. Has seen larger fruit, but none handsomer. It is very uniform in size, and of good quality. The soil on which they grew was similar to our Pennsylvania soil.

Mr. CALDER. This question of soil is a very important one. Many varieties of strawberries, as well as other fruits, do well in some soils, and utterly fail in others.

Mr. MEEHAN referred to the Mexican ever-bearing strawberry as one that would succeed only in certain localities. Saw some years ago a field of ten acres, near Detroit, Michigan, and when within one half mile of the ground, it seemed scarlet with berries. Actually picked a milk pan full without going from the spot. Has also seen attempts to grow it elsewhere, but the fruit was no larger than a pea, and could scarcely find a milk pan full on an acre. There seemed something in the soil near Detroit to which it was specially adapted, and so with many other kinds that succeed in certain soils and localities. Has much faith in Mr. Parry's opinion, as he has practical experience, and more than the usual amount of acumen in the selection of varieties. He is himself one of our most extensive growers of small fruits, and has brought to notice many new and valuable varieties.

The Treasurer, Mr. G. B. THOMAS, stated that he would be on hand after adjournment to receive the names of such as wish to become members of the Society. The fee of annual membership is one dollar, which entitles the member to the annual reports of the Society free of charge. Would be pleased to see a large accession of new members.

Mr. ELLIS advised all who contemplate joining the Society, to become *life* instead of *annual* members. The fee is ten dollars, and the reports and printed matter of the Society furnish a constant feast of information.

Mr. SPROUT hoped the resolution in reference to cattle running at large in the State, will be adopted at this and at every annual meeting, until we have such a law upon our statute books. This is the chief cause of the destruction of our young forests. He moved the re-adoption of the resolution, and it was carried unanimously.

The following is the resolution, as adopted:

Resolved, That it is the opinion of this Society, that our Legislature should pass a general law prohibiting the running at large of cattle, horses, sheep, and swine.

Mr. ELLIS indorsed the resolution; but we must send a different class of men to our Legislature to have passed such a law as we need. Helped to send in a very lengthy petition some years ago, and it was rolled under the table. Before adjournment, wish to call attention to a new seedling grape grown by Mr. Thomas Evenden, of Williamsport. The fruit is of fine quality and makes a good wine, which is hoped Mr. E. would introduce before the Society adjourned finally.

Adjourned.

AFTERNOON SESSION.

After re-assembling, and before proceeding with the regular programme of business, the President called attention to a claim against the Society of long standing, presented by Mr. Marot, of Philadelphia. After reading the statement of Mr. Marot, Mr. Meehan was called upon to state what he knew concerning it.

Mr. **MEEHAN** could throw no further light upon the subject. It was incurred by the publication of some of the Society's reports, but the matter was placed in the hands of a publication committee, who made the necessary arrangements, and could probably explain.

Mr. **ENGLE** was not aware that a claim of this kind was pending against the Society. While our treasury is probably not able to meet it at present, it would be well to have it examined. He moved, therefore, that a committee of two be appointed to confer with Mr. Marot, and report at our next meeting. The motion was adopted, and George B. Thomas and Charles H. Miller were appointed said committee.

The following essay was next read:

LANDSCAPE ADORNMENT OF RURAL HOMES.

By CHARLES H. MILLER, *Landscape Gardener of Fairmount Park, and late Chief of Bureau of Horticulture of International Exposition.*

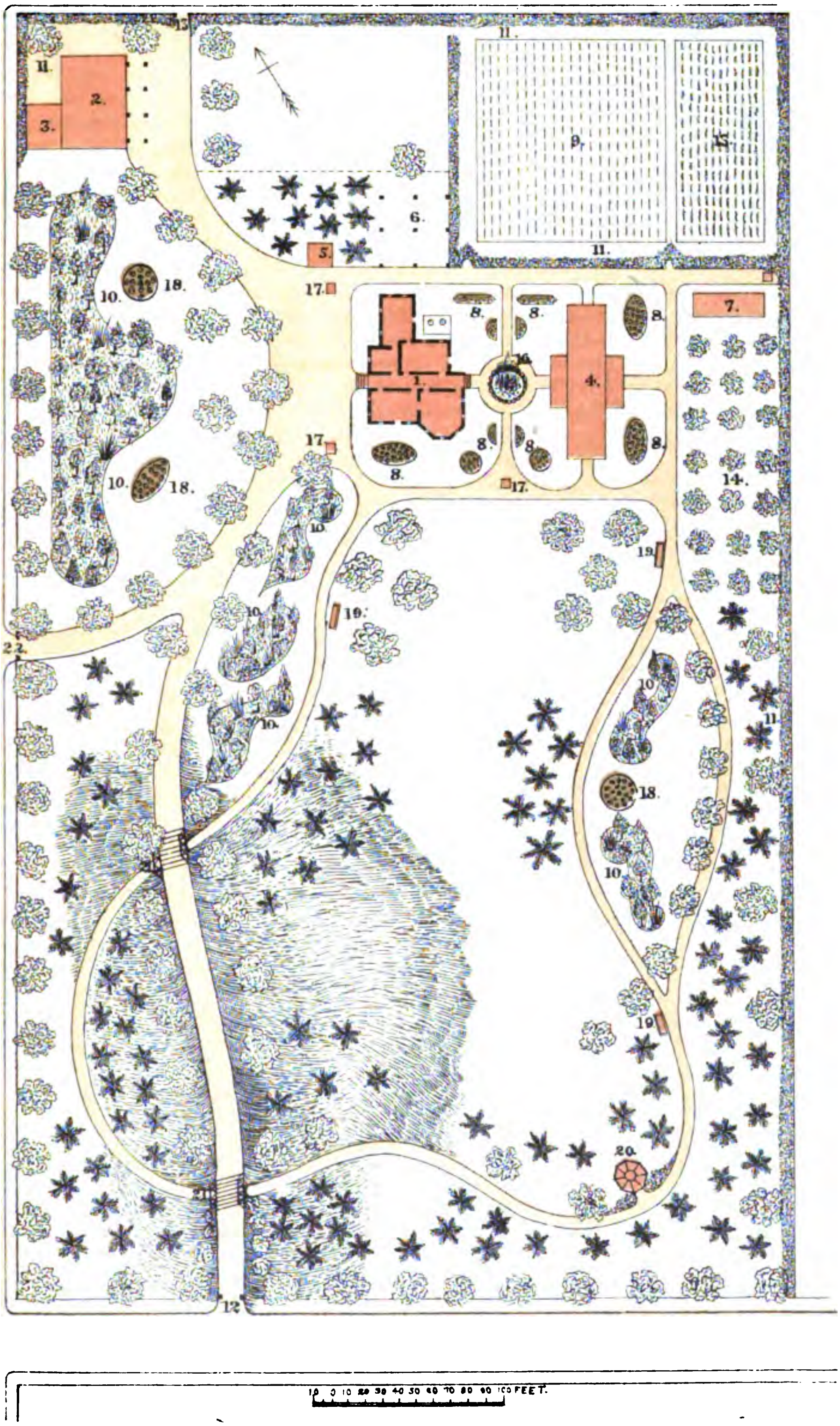
Mr. PRESIDENT, LADIES, AND GENTLEMEN: I merely wish to say a few words to you, who are all, I trust, intimately connected with gardening, and interested in its advancement—on the means we should employ towards the promotion of our art and our intellectual improvement. We have associated ourselves exclusively for a benevolent purpose, for mutual benefit, and for the good of our fellow men. Our aim is to increase the technical knowledge of gardening, and to disseminate correct rules of practice among those who make horticulture a pleasant recreation, and in pursuing this design we ask aid and coöperation from all who are devoted to the cultivation of the good and beautiful in nature.

Horticulture.

Of late years, the term "horticulture" has become more fashionable than than that of "gardening," and many who eschewed the old appellation have felt honored by the new name; but the words mean the same thing. Farming, also, has become fashionable under the term agriculture, and farmers are now called "agriculturists." As horticulture progressed, the art became divided into several branches, and was aided by the researches of scientific men, landscape gardening, esculent gardening, and flower gardening, including the study of rural taste and the adornment of public and private grounds.

Rural Taste.

Horticulture has done much to inculcate the principles of taste, and teach the pleasures of rural life, and it is not too much to assert that rural taste itself is a necessary adjunct to civilization, the advantages of which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the most earnest utilitarian will admit and advocate; for the practice of rural taste in the adornment of one's home is only the application to rural economy. From what source have originated the palatial residences of our city merchants and other wealthy citizens, but from the indulgence of that taste in domestic affairs, which, when directed to rural adornment, expends its energies in drawing out the beauties of nature for our benefit and admiration?

There are other considerations of equal, and even of greater, weight, which evince as distinctly the benefit of rural taste. Diligence and activity of body and mind are no less beneficial to us in the pursuit of innocent recreations than they are instrumental to our prosperity in business occupations, and whether we turn our thoughts to the merchant retired from the busy life of trade, to the farmer, or to the more humble artisan in his cottage, we shall be disappointed if we do not find that each one who employs his leisure hours, be they many or few, in the embellishment and adornment of his country home, adds thereby daily to his stock of health, and we are sure it will be admitted, that to add increased health to body and mind, is to make good use of our time.

Another great use, which cannot be overestimated in the cultivation of rural taste, is to be found in the powerful influence which—experience bears testimony to—it exercises over the social intercourse of a neighborhood. We could, in support of this view, mention many instances in numerous parts of the country, and our personal observations will present the proofs of its truth. The kindly relations, the good offices, and the interest in each other's rural enjoyments, which the practice and extension of rural adornment in any neighborhood never fails to draw forth, are ample proofs, that if it be commendable to love one another, to contribute to the comforts of our neighbors, and to associate our rising generation with a state of things around them, that is calculated to call forth their better natures to the adaptation of the social wants of their fellow man—if these objects are commendable, then rural taste has its use, and its benefits must be admitted.

The cultivation of the beautiful in nature has been justly considered an important element in the culture and education of mankind. It is to every beloved home in the country its greatest outward charm, and to the country itself its greatest attraction. A traveler never travels through England, without speaking in the highest terms of admiration of the taste there displayed by the people, in the rural embellishment of their homes, and his praises are as justly due to the wayside cottages of the humble laborers as to the great palaces, public gardens, and parks, and all this is owing to the love of horticulture and the taste for something above the mere useful, which characterizes their owners, as a class, and which renders their homes so beautiful, with the bloom and fragrance of the loveliest flowers and shrubs. The contrast with the comparatively naked and neglected country dwellings that are the average rural homes of our country at large, and the neglected condition of the surroundings of our public and charitable institutions, is very striking. Undoubtedly this is, in some measure, owing to the want of means, as well as the absence of a true love for rural life, and for which time and cultivation will effect a remedy; for it requires more time and patience to garden well than to build finely. A stately builiding can be designed and erected in a few months, with ample means, but it requires the same number of years to surround it with beautiful tress and shrubs. The want of means, or the newness of our civilization, is not, however, sufficient apology for the apparent want of that culture and refinement, so essential to home life. Immense sums are lavished upon fine buildings and stately edifices, rich furniture, and handsome equipages, while the garden and grounds are left bare and bald for want of cultivation, an evidence of the want of taste or an utter indifference to what is essential to the requirements of modern civilization.

What we lack, perhaps, more than all, is not the capacity to perceive and enjoy the beauty of ornamental gardening, and the pleasure derived from the planting of trees and flowers—the rural adornment alike of cottage and more substantial dwelling—but we are, as a people, deficient in the knowledge and the opportunity of knowing how beautiful our homes may be made, by a little time, taste, and means expended in this way. In older countries it is clearly seen that the taste there displayed has been fostered and encouraged by the rich, and, during a long series of years, the taste has gradually descended from the palaces of the wealthy, the public parks and gardens of the nations, to the homes of the many.

The influence of the examples of good taste and liberal encouragement of late years, in our public parks, and in the dwellings of our more wealthy citizens, on the neighborhood in which they are situated, is having its good effects, and is one of the best proofs of the growth of good taste, proving beyond doubt that the people do not lack that appreciation of the beauties and pleasures of rural embellishments, but would gladly do something to give a sentiment to their homes, but are ignorant of the way to set about it, and consequently, do some things that ought not to be done, and leave undone those that ought to be done. The public parks and gardens, the pretty residences around and in the immediate neighborhood of our large cities, such as Boston, Philadelphia, and others, have long been famed for their beautiful gardens, and they have done much towards the cultivation of a correct taste in gardening.

The taste for rural improvements of every description is rapidly advancing in this country, and handsome villa residences are becoming more numerous; but it would require more time and space than our present limit to give even a faint idea of the progress in this direction.

In the country at large, however, there is much room for improvement, and it cannot be said that there is anything like a general taste for gardening or for the embellishment of the homes of the people. We are, as a class, too much occupied making a great deal, to have reached that point when we think it better and wiser to enjoy a little well than to exhaust both body and mind in getting an indefinite more.

The planting, laying out, and the execution of the necessary details in connection with rural improvements, is a comprehensive art, embracing the taste and artistic touch of the landscape painter with the art of the landscape gardener; the scientific knowledge of the engineer with a thorough knowledge of the material to be used, with a sound judgment acquired by practice and experience.

Effect on the Public Taste.

Much good in this way has been accomplished, but much remains to be done before we can justly lay claim to a full appreciation of the art, and it cannot be too forcibly or earnestly urged upon the attention of those who have built and endowed, or have been intrusted with the management of our educational institutions, that one of the most certain means of encouraging a desire for studies in natural history, and of forming correct principles of taste in young minds, is that of landscape gardening, and the rural adornment of school-houses and college grounds. With very few exceptions, the surroundings of such establishments have been sadly neglected, thus depriving the student of the opportunity to acquire a correct taste in one of the most necessary branches of natural history, and that high order of taste possessed by every person of culture and refinement.

Whether the neglect arises from pecuniary embarrassments, or from a want of the proper appreciation of the principles of such branches of study, the fact remains the same, and the neglect appears altogether unpardonable. That institutions of long standing entirely neglect this branch of study, so essential to the formation of correct principles of taste and refinement, is really one of the greatest wants of the existing system of college education, and one that cannot long escape the notice of those who have it in their power to apply the remedy. For, if education means anything, it means good to men—to men of all classes—in its power to evolve and diffuse practical knowledge and skill, true taste, love of industry, and sound morality, and not only through its apparatus, experiments, instructions, annual lectures, and reports, but through its thousands of graduates in every pursuit of life.

In order to carry out the principles here enunciated, there should be, in all our educational institutions, grounds devoted to a botanical and a common garden, orchards containing the various species of fruits, lawns, and promenades, in which the beautiful art of landscape gardening could be appropriately applied and illustrated, pasture, meadow, and tillage land needful for the prosecution of useful experiments. On these grounds should be collected and exhibited every variety of trees and shrubs, officinal, medicinal, and other plants of botanical interest, that minister to the health, wealth, or taste of the people. Their natural habits, merits, production, improvement, and culture, should be thoroughly scrutinized, tested, and made known to the students, and through them to the country at large.

Having said this much in regard to the benefits to be derived from the cultivation of rural taste, I will now say a few words as to the material used in connection with rural adornment. In regard to the trees and shrubs so essential to the embellishment of country homes, and which so largely contribute towards the landscape effects of the country, very little need here be said. The numerous catalogues of the leading nurserymen give full descriptions and directions as to planting and cultivation.

The Rhododendron as a Decorative Plant.

There is, however, one class of plants that I think requires special mention, with a view to correct, if possible, some false impressions that are prevalent in connection with its management.

Beautiful as are many of the dwarf evergreens in common use for general decorative purposes, I know of none more desirable than the Rhododendron as material that goes to make up the perfect *tout ensemble* so much desired by the landscape artist.

Rhododendrons, when planted and grouped with taste and judgment, produce such telling effects in garden and park scenery that they should be planted wherever there is room for an undergrowth of shrubs. They not only produce in the blooming season glorious masses of bloom, but throughout the year they are quite equal in appearance to any of the pretty evergreens which are now so popular.

Compare a clump of Rhododendrons with a group of any other kind of shrubs or evergreens and they loose nothing by the comparison. Compare them when in bloom with any other class of plants or flowering shrubs, and I know of nothing more beautiful. We have nothing to compare to them in their season, and the beautiful effects of large masses of Rhododendrons, whether in or out of bloom, upon the landscape in park or garden, is particularly striking; indeed, for general decoration I know of nothing so desirable.

They are not more costly than other choice evergreen shrubs, as it is not necessary to choose the select named kinds for general use.

The Rhododendrons Maximum and Catawbiense and their varieties will always prove hardy, and where grand masses of color for summer decorations are of greater importance than finely formed flowers, or well arranged trusses, the common varieties are better than the high priced sorts. It is true the more choice kinds furnish us with a greater variety of color, and they are valuable for beds or sheltered nooks near the point of observation.

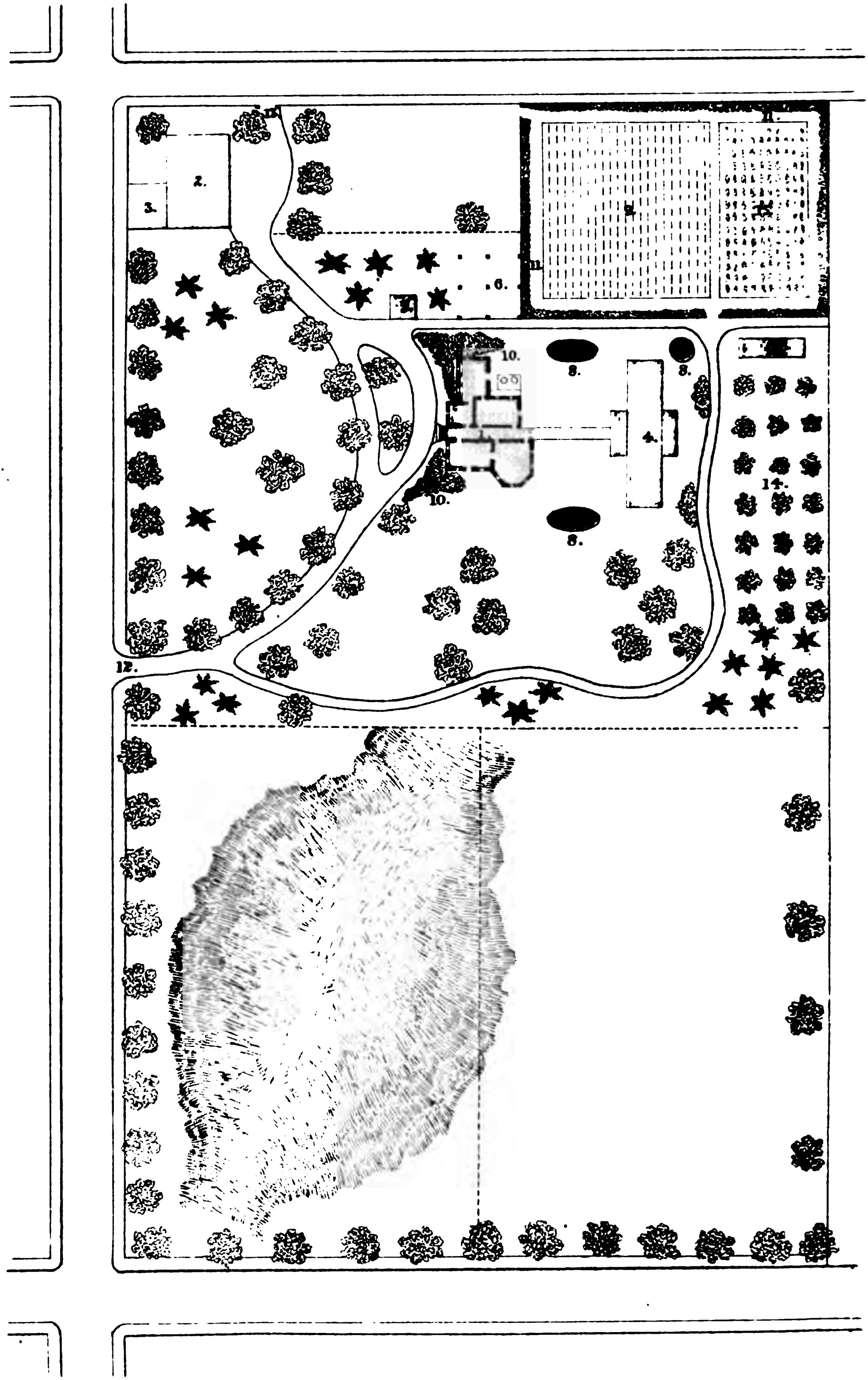
As seen from the dwelling there should be some diversity of color, and there is no difficulty in obtaining select varities with flowers varying from creamy white to dark purple, and from pure rose to deep crimson. There is no limit to our choice in the selection of colors. But for large groups or beds planted some distance from the drive, and for forming masses in the foreground to ornamental planting, the common Maximum or Mountain Laurel, and the hardy varieties of Catawbiense, are quite as effective as the more expensive kinds.

Rhododendron culture can be made as universal as that of the rose, or any other florist flower, and a collection of named sorts would be exceedingly interesting; but a thorough acquaintance and a critical taste is necessary to appreciate them. Again: some of the most beautiful are among the most tender, and require careful treatment, such as protection in winter and shelter from the hot sun in summer—in fact, require the careful treatment of the amateur. I am not looking at the subject, at present, with the eye of the florist, but from the standpoint of the landscape gardener, and use them as material for producing striking effects in the landscape and garden at a time when it is usually appreciated. The Rhododendron, when used as above described, is capable of producing effects of surpassing richness. They must be planted in bold clumps where they have room for their full development, and if placed in anything like a favorable situation, the free growing kinds will soon attain a good size, and will yearly increase in dimensions.

The hardy kinds require no special preparation of the soil, for they thrive and flower freely in almost any soil, provided it is free from lime and gravel. There can, however, be no question as to the superiority of fibrous loam—the top spit of an old pasture taken off to the depth of from four to six inches is the best. The point is to have the soil full of fibrous matter. Mixtures of decayed wood and leaves are objectionable, and those who have formed beds with a mixture of such material, stand a chance of the roots being injured by fungi developed by the rotten wood.

The Rhododendron is apt to suffer from drought, our summers being long and sometimes exceedingly dry, consequently, as a rule, they thrive best when planted in a moderately moist position. They also like partial shade during the summer season, but under ordinary circumstances they do exceedingly well when planted in a situation exposed to the sun the whole year. One need only consider the fitness as far as situation is concerned.

As to transplanting, they can be moved with safety at almost any time, with the exception of in the dead of winter. I, however, prefer the fall—say September and October. The nights are then getting cooler, and as



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the plants will receive considerable moisture from the night dews, the check received in removal will be considerably lessened. In very dry seasons they will require several good waterings if exposed to the full sun, but in a season like the last, they do not require it. Mulching during the summer months is very essential to their well doing. In fact, I may say that I consider mulching both in summer and winter, indispensable to their successful cultivation. One-year old leaves and old rotten manure make an excellent mulch.

Bedding Out.

The system of bedding out has acquired great popularity through the perfection it has attained in great gardens under the hands of men skilled in color, and required by their positions to produce grand effects.

The geometric garden is an ancient feature in a rural adornment, but the fashion now adopted is essentially modern, both in design and material. Where there is ample space, variety of scenery, and the means can be afforded for this kind of display, it is appropriate and acceptable.

The love of color, as exhibited in the popular appreciation of the many varieties of foliage plants, is as general as the love of music, and a display of bedding plants, when arranged with taste, is full of delight for the artist, and admirably exemplifies the capabilities of decorative gardening. Excesses and mistakes, however, occur in all pursuits and plans of life, and gardening is no exception to the rule.

The great and common defect in this mode of decoration is its flatness. The eye soon wearies when constantly looking at mere circles and oblongs and complicated designs in the masses of color and the arrangement of beds that are only fitted to please when placed where they are seen but occasionally.

There is wanting material to interest the mind where the display consists of regular forms and color only, and the remedy is to be found in the introduction of plants of distinct and graceful outline.

The beautiful varieties of Conifers, such as Taxus, Cupressus, Thuja, and Retinospora, supply this want.

There are also many beautiful tropical-looking plants, such as Arundos, Palms, Pampas Grass, Ricinus, Yuccas, and many others in abundance that furnish ample opportunity in every garden which is at all adapted for a bedding display, for the introduction of beautiful forms which impart elegance and give a pleasing variety to the whole arrangement.

Lawns.

The pleasure of a garden depends so much on the proper keeping of the Lawn that I may say, without contradiction, that where the grass which constitutes the Lawn is not kept in good order there can be no just appreciation of any part of the garden, even if it be otherwise skillfully managed.

In rural adornment the Lawn is the principal attraction—the setting to the jewel, or the ground-work to the picture—and constitutes one of the greatest pleasures in connection with country homes.

As I cannot, in this short address, go into the details necessary to the acquisition of a good Lawn, I will only say to those who already possess such a pleasure, that, to keep a Lawn in good order, the following rules should be adhered to: Top dress with manure or bone dust in the spring. Roll often with a heavy roller. Use the mowing machine frequently, but do not cut too close. Water seldom in hot weather; cold water in summer is very injurious; it kills the tender grass, and promotes the growth of fall grass.

Within the past few years there is a marked improvement in the management of Lawns in this country, and now beautiful smooth Lawns, as good as those we have seen and read about in England, are here not unfrequently seen.

Arborescent Gardening.

Arborescent gardening is a term but lately adopted. It means the judicious disposition of trees and shrubs, in connection with summer bedding plants, and is destined to supersede the system of filling up the flower beds in winter with evergreens, called in England "winter gardening." Arborescent gardening, in connection with summer decoration, when properly carried out, can be made a telling feature, and obviates the necessity of drawing on a reserve of evergreens to clothe the winter scene in the flower garden.

The permanent planting of choice evergreen trees and shrubs in connection with summer bedding is a step in the right direction, and, to effect this desirable end, it will be necessary to make some changes in the present system and arrangement of the beds, so that when the trees and shrubs are planted it shall appear perfect in itself—like unto a picture frame—and when the flowers in summer are added, the whole will be complete.

The effort to make our gardens attractive in autumn and winter is a necessity. Our summers for tender plants are very short, and although the summer bedding is exceedingly brilliant while it lasts, it is but of short duration, and the gardens are empty from October until May.

It often happens that frost overtakes us in September, destroying the beauty of summer bedding plants, and is followed by fair weather for two months, at a time when out-door exercise is healthy and agreeable, consequently our gardens should then be in their most attractive form.

Arborescent gardening has been partially adopted here, and I see no reason why it should not become popular in this country. We have an abundance of material, our collection of evergreen shrubs is rich in color and form, and, by judicious arrangement, can be made to take the place of many of the summer bedding plants, thereby materially lessening the labor of annually replacing them.

There are also many deciduous trees and shrubs, such as the Purple Beech, Tamarisk, Cypress, Variegated Althea, and others, that, by a judicious use of the pruning knife, can be made objects of great beauty, and which make admirable backgrounds for summer foliage plants. I cannot imagine anything more beautiful than beds of evergreen, such as Golden Yews, Variegated Box, Golden Retinosporas, and Thujas, edged or mixed with Variegated Euonymus, Daphne Cneorum, and others of like nature.

The field of enterprise thus open to all who have a taste for rural adornment is a rich subject that abounds with interest, and in most gardens arborescent adornment can be made a splendid feature, and, when well done, will give a lasting pleasure.

Mr. ENGLE followed with an essay on

PENNSYLVANIA APPLES FOR EXPORT.

By H. M. ENGLE.

MR. PRESIDENT: To give this meeting of intelligent fruit growers a dissertation on "Pennsylvania apples for export," while our State instead of exporting is annually importing thousands of barrels of apples for home consumption, must be considered in the prospective. It is, however, not asserted here that Pennsylvania does not export any apples, for some of the western counties have fallen in line with the New York trade, but our trade is so insignificant that it is scarcely worthy of notice, compared with that of New York and several other States. That Pennsylvania to-day might be rivaling any State in the Union, in the exporting of apples, had she pursued a course similar to that of other States now so far advanced in this branch of industry, your essayist firmly believes.

Had Pennsylvania fruit growers formed active societies as early as New England and New York did, and made efforts to disseminate and establish a reputation for the best and most reliable apples, native to the State, and at the same time diffused information necessary to the planting and management of orchards, as well as the picking, handling, and marketing of their fruits, the commercial value of our orchard products would amount to hundreds of thousands of dollars annually; but instead of taking an independent course, we simply aped after New England and New York, taking for granted that the varieties that succeeded there, were just what *we* wanted, and thus have for the last twenty-five or thirty years planted northern and northeastern winter apples trees, and have harvested fall apples. No wonder we don't export. Now, what makes the present aspect the more humiliating is, that all the while Pennsylvania had apples, native or otherwise, just as good as those that have been disseminated in consequence of their popularity at home, and just as well adapted to her soils and latitude as those of other latitudes were to their native place. It is not claimed that fruits do not succeed except in the vicinity where they originated, but it is conceded that varieties of fruit that give satisfaction everywhere are few and far between. Under these circumstances your essayist feels more disposed to lecture Pennsylvanians for our short-sightedness in the past, than to tell us what apples to export while we have none; besides, if we had them, it is only the few that would know how to manage them properly for exporting.

I am, however, gratified to announce that a new era has opened for our State. By the diffusion of pomological knowledge, many of our citizens have learned to know the commercial value of apples in other States, as well as the steadily increasing demand abroad for the same; they have also learned to know our mistake in the selection of winter varieties, which only are valuable for export. It is therefore claimed, that we are rather in a transition state, which should tend to repair in the next quarter of a century what we have lost in the last, in the apple business, by not being sufficiently wide awake. My subject, however, is "Pennsylvania apples for export." I shall consider Pennsylvania seedlings first. I do not see why Smith's Cider and York Imperial might not become as popular abroad as at home. The former is, no doubt, the most reliable winter apple in Eastern Pennsylvania, and York Imperial very little behind; both are showy, of good quality, reliable bearers, and good keepers. York Stripe is larger, more showy, and of better quality than either, but, perhaps, not quite so good a keeper. Should it prove as reliable a bearer, it is destined to become one of our most valuable winter apples, and therefore may come in competition with the best northern apples in foreign markets. Belmont: It seems strange that an apple with so many excellent qualities should have been so long overlooked in its native State, while it became very popular abroad. I would bespeak for this apple a promising future, when our State goes into the exporting business. Smoke-house, although not a very attractive name, there is nothing smoky about it. I know of no apple that is more sought for in its season where it is known, and it will become popular whenever it can be obtained in perfection; and if its season could be extended a month or two it would rank among the most promising for export. Rambo is equally popular with the latter, but simply as a dessert apple, maturing about the same time, in early winter, which will prevent them from becoming very valuable for export. Ewalt: This fine, large, showy apple is looming up in popularity. In appearance it has few rivals among winter apples. The most that can be said against it is that it is rather acid as a dessert apple before it is fully ripe, but for culinary uses it is No. 1. I have known it to sell in Chestnut street, Philadelphia, at eight dollars per barrel, while the price of winter apples generally ranged from three to four dollars. Should it bear exporting well, it would in my opinion, outsell any other American variety now shipped to foreign markets. Major and Creek are both new promising winter apples of very good quality, and worthy of more extended cultivation. In addition to these there are many valuable native winter apples that have only a local reputation, some of which will, no doubt, prove equal to any of the generally popular kinds. Among the varieties not Pennsylvania seedlings, the green Newtown Pippin has in some localities succeeded well, and among apples shipped to foreign markets, it has thus far sold at higher figures than any other. Were the Yellow Bellflower as firm, so as to bear shipping well, it would be one of the most valuable for export. Peck's Pleasant is scarcely inferior in flavor to Newtown Pippin, of larger size, more showy, and the tree a more vigorous grower. I do not see why this apple should not stand as high in any market as the Newtown Pippin. I would not hesitate to plant Rome Beauty and Ben Davis, both of which are good, showy, and productive, as well as good keepers. Romanite: I do not see why this showy and very productive apple might not become valuable for export. It is of good quality and an excellent keeper, and would bear shipping as well as any apple with which I am acquainted. There are, however, two varieties disseminated under the same name, with synonyms of Gilpin, Carthouse, and others. They are both southern apples, and similar in many respects. I am confident that both have been grown in the same orchard, under the same name and as the same fruit. I believe the above named varieties have all proven worthy of cultivation in some localities in our State, mostly in the eastern division.

There are many other varieties worthy of notice, perhaps as valuable for export as those just referred to; but for some time I have been more disposed to strike a number from our catalogues, than to add more, unless proving of superior merit. I do, however, not wish to be understood as discouraging the planting in our State, wherever they succeed, of those excellent northern varieties, which have became famous both at home and abroad; for in our northwestern counties they have proved much better keepers than in the eastern part of the State. The same may be said of the higher altitudes of the mountainous sections throughout the State to its southern border. Therefore, Hubbardston, Baldwin, E. Spitzenberg, Northern Spy, Rhode Island Greening, King, American, Golden, and Rox Russets and other northern apples may prove valuable for export in those sections of our State just referred to.

In order to establish a commercial interest in the apple trade of our State, more orchards must be planted, and those already established better cared for. There are both land and capital lying idle, or partly so, to pay investors a large profit, and the State a commercial income of hundreds of thousands of dollars annually. To such as would invest in this enterprise of apple growing as a business, I would say select a good location for an orchard, better a little rough and hilly than too low or wet.

Prepare the ground as you would for a field crop, observe the orchards surrounding yours close by, and make the largest proportion of your list of such varieties that succeed best in your neighborhood, and upon similar soils. Plant only young thrifty trees, not more than three years old, plant not deeper than they stood in the nursery, and head in the branches at planting, but get and save all the roots you can. Mulch your trees the first season with manure or any rubbish that will keep the earth beneath moist, and cultivate well with summer crops for six or eight years at least. Plan the shape of your trees from the start, and prune so as never to have occasion to cut off large branches. Nothing but finger and thumb and pocket knife should ever be used for pruning fruit trees while in thrifty condition, and such they should always be so long as you expect to harvest paying crops from them. When the trees commence bearing, keep the ground in good fertility with proper manures, which should be applied in proportion to the crops that your trees will yield. Keep out borers from trees, and any other insects injurious to trees and fruit, but especially keep down the codling moth, by the application of bands around the stems of the trees. When the crop is large, thin out as systematically as you would your corn when planted too thick. All fruits will keep better if not left get too ripe on the tree. In gathering for market, reject all unsound and gnarly specimens. It will pay to make two or three grades of almost any fruit for market purposes, so as to have it run uniform. Pack carefully in new barrels, but by all means avoid deception, which is too common, in which the barrel is topped off with specimens far above the average. Do not close the barrels at once unless the weather is quite cool. Press the fruits so as not to move in the barrels while they are handled. Place in a cool or rather cool place until freezing weather. Slight freezing after the barrels are closed will not injure them, but they must not be roughly handled in that condition. Fix your brand on every barrel and also the grade of fruit it contains, and build up a reputation that you never need be ashamed of. By planting more extensively, and following the above directions, I will predict that the rising generation of our State will be enabled to talk more intelligently on Pennsylvania apples for export, than your essayist possibly can on this occasion.

Apple culture in Eastern Pennsylvania, was the subjest of a very practical essay by Mr. Cooper, President of Lancaster County Agricultural and Horticultural Society:

APPLE CULTURE IN EASTERN PENNSYLVANIA.

In undertaking the task of writing an article upon this subject, I fear our worthy chairman has made a grave error in assigning it to me. Not having a taste for writing or addressing public meetings, I have never cultivated that pleasing address so essential to entertain an audience. I, therefore, hope the members of this Society will excuse all defects; nor expect me to tell you how to grow apples, without some effort on your part. The great ambition of the American people is to leap after results, ever ill content to await the natural course of things. Many plant a tree to-day, and to-morrow enter a complaint that it does not show signs of growth. So hasty are we to reap the reward of our labor, that many fail for want of the proper care, patience, treatment, and labor necessary to accomplish certain ends; but enough on that score.

Location should be the first consideration in planting an orchard. Choose rolling ground, and the elevation as great as circumstances will allow. Protected, if possible, from the north and wests blast of our changeable climate; would prefer an eastern or southeastern slope, avoiding a southwestern, on account of the great danger of the trees being winter killed by the afternoon rays of a warm winter's sun. A few years ago, a customer came to my place for a small orchard, and asked my opinion as to planting in low land. I discouraged him from planting in low, swampy ground, that would not, naturally, drain itself, and that, in all probability, they would not succeed. His answer was, "I tries them anyhow." Being familiar with the location, I carefully watched the result. The first summer they looked well, and, to all outward appearance, you might suppose the experiment would be a success; but in a year or two I observed their decline, and in about four or five years, when you would expect some fruit, they were all dead.

The soil should be light and porous. Would prefer a sand or slaty loam, with a sub-soil that would quickly drain off all surface water that could not run away in a few hours. Such as do not have the above, might select flint or gravelly loam, always avoiding that of a tenacious character; observing the sub-soil to see that it is sufficiently porus to allow of proper drainage. Even were the surface so full of small stones that it would seem almost impossible to find earth enough to get the trees started, I would consider the chances of success greater than on flat land of the highest fertility. I do not think it necessary that the soil should be in that high state of cultivation so frequently recommended. This would answer very well if timber is wanted; but to produce good healthy wood, I cannot recommendthe selections of such location to grow fruit. Nor is it advisable to use high stimulating manures, that have a tendency to produce too rapid growth.

Preparation of the soil is, by no means, a secondary consideration; the plowing, harrowing, &c., should be as thorough as if a field of potatoes, or corn, are to be planted; and, if not naturally drained, the ground should be sub-soiled at least sixteen inches deep, to assist in carrying off all surface water as quickly as possible. If the location be such as not to provide a proper drainage, it might be plowed in lands, as wide as it is desirable to set the trees, throwing it up in ridges, as high as practicable by cross plowing, until the desired elevation is had. Having thoroughly pulverized the soil, and made it as friable as is practicable to do, you are ready to stake off the orchard, according to the fancy of the planter, allowing for each standard tree nine hundred square feet, or thirty feet each way.

Digging the holes is also an important part of the preparation that too many planters are apt to neglect. Some skill and judgment are necessary here. It is not a post hole that is wanted, but one that a tree is expected to grow and flourish in. If for spring planting, would prefer to have them prepared in the fall, so that by frequent thawing and freezing, nature assists in pulverizing to that mealy condition so necessary to insure success.

If the sub-soil be of clay, it should be put in a pile by itself, and the hole sufficiently large to allow all the roots to stand in their natural position when the tree is planted.

Having made all the necessary preparation, the question what varieties to plant and were to get the trees, is by odds the most vexatious problem to be solved. The unprincipled vendors who have canvassed the country so thoroughly that scarce a house escaped in the rural districts; the cities, too, have not been neglected, have so grossly deceived the people, that they look with suspicion upon all who offer anything in that line. Their handsomly colored plates and specimen fruit put up in alcohol, in white glass jars, blown in such shape as to magnify to near twice its natural size, was well calculated to induce subscriptions at the fabulous prices some of then realized. Such tales as "stawberries growing bushes two or three feet high;" peaches on roots the borer would not touch; "wild-goose plums" that the curculio "could not penetrate," in short, everything much finer and of sorts that could not be had, except by subsciption through them, conveys but a meager idea of ways adopted to take in the unwary public. In many instances they had much better have thrown the trees to the brush heap and applied the torch, than have planted, and after years of waiting and care been doomed to disappointment in not getting what they ordered, and sorts unsuited to their location.

Every one contemplating planting an orchard should first inquire, (if not already posted,) what varieties do best in that immediate vicinity, and of such plant at least three fourths of the plot. The balance may be of those that give promise of fruitfulness and quality in many localities. The great error has been with most of us, to want something new, never for a moment thinking, that if an apple succeed well in our section, it may not do in another.

This I attribute, in a large measure, is the cause of many failures in our section. The fine fruits brought to our markets from central and western New York has induced planters to try them here, but at last found them unsuited to this section. Hence, they condemn all, because they could not grow fruit to compete with the noted fruit growers of New York. In referring to this matter so fully, I wish to be understood, that at least four fifths of the failures might be traced to the follv of planters choosing such sorts as have no established merit, either for quality or bearing. I therefore repeat the appeal, to select only those as do best in each particular neighborhood. If, however, the planter is desirous of testing varieties unknown in his section, and has sufficient ground to experiment, I would, by all means, encourage such in the good work; for by trial, and an occasional failure, too, are we in the end enabled to decide what to plant.

Of sorts I might name the following as a list, that generally do well in Lancaster county: Early Harvest, Sweet Bough, Jeffries, All Summer, Townsend, Early Strawberry, Benoni, Hawley or Douse, Munson Sweet, Sweet Rambo, Apple-butter, Smoke-house, Rambo, Fallawater, Ortley or White Belle-fleur, Dominie, Smith's Cider, Nedley or Spice, York Imperial, Baldwin, Hub Nonsuch, Krouser, Romanite, Winesap, L. I. Russet, Winter Sweet Paradise, and Talman Sweet.

As to where to get the trees, would say, make out your list, and send direct to any reliable nurseryman, requesting him, at the proper season, to forward, by express, trees not over three years old, as I fully believe at that age will succeed much better than either older or younger. They should be five to seven feet high, according to the growth of the variety. The greatest care should be taken to secure the roots from the high drying wind so common in the spring. They should be "heeled in" at once, (on being unpacked,) in such lots as to best suit the convenience of the planter. Each tree should be carefully set about the same depth it grew in the nursery, and with the hands or a smooth, round stick, the roots combed out in their natural position as the hole is filled, using the soil previously spoken of to cover and work in among them, and the clay to fill up the balance, making a small hill six or eight inches high around each tree, and tramp it tightly to secure from wind and storm.

The ground between the rows may be cultivated in any low growing crop, the first eight or ten years, using any old, well decomposed manure that will best promote the growth under cultivation. Care should be taken to keep the trees straight, and occasionally "head back," to keep them in good shape, and not to high, the branches not more than four or five feet from the ground, limbs thinned out, as the tree advances, with a common pruning knife, so that by the time they begin to bear you have a good, round, even balanced head, and no superfluous limbs to mar the beauty or productiveness of the tree. Care should also be taken to remove all suckers (the great bane to fruitfulness,) at least once a year, and also to preserve all small branches and spurs that grow on and near the butt. These I concede have an important work to perform, in shading the trunk and limbs, and also have a tendency to increase their thickness, thereby making them stronger, and much less likely to break under the great weight they are sometimes required to carry. A judicious thinning of the outer branches will also assist in setting and maturing fruit along the body of limbs from the spurs above referred to.

The borer, the great pest of the orchardist, must be closely watched, at least twice a year for the few first years. I know of no better remedy, nor more reliable way of exterminating the little brown-headed grub, than to use a good stiff bladed knife, a piece of steel wire, a trowel to remove the earth from the butt of the trees, and a pair of sharp eyes to determine their whereabouts, a few vertical cuts, a probe or two with the wire, and the work is effectually done. Hill up the earth and proceed to the next, and on to the last tree in the orchard. By this means you will have performed the work in a much better manner, and more successfully, than all the patent eradicators extant.

An annual wash of fresh slacked lime, thickened with good dry wood-ashes to a proper consistency to apply with a brush, will materially assist the trees in growth, and preserve the bark in good healthy condition, also kill many insects and their larva, that secret themselves under the bark and other crevices about the body of the tree.

The codling moth will also claim a share of your attention, the larva being deposited soon after the fruit is formed, penetrates the skin, and is soon embedded in the apple, living upon is juices until fully developed, when the fruit, being knotty and imperfect, falls, and it pass into the ground, to soon reappear a perfect moth, to commit other depredations. The plans recommended by most successful orchardists for catching them, are, I presume, all good in their way, but want a little more general and vigorous application.

The mode adopted by some, of plowing orchards that are full grown and seeded to grass for a number of years, is, in my judgment, a grave error. The small rootlets that live and penetrate the soil near the surface, and take their nourishment partly from the air, must of necessity be destroyed by the plow, hence it may take several years to reëstablish what a little forethought might have avoided. With the tops of the trees low, and an occasional harrowing with a sharp spike-harrow, the sod will never become too much bound to injure the vitality or productiveness of the trees. An occasional top dressing of well decomposed manure, and say one bushel of wood ashes per tree, together with the grass and other vegetable matter left to decay upon the surface, will preserve the trees in a good state of fruitfulness to a ripe old age.

Thanking you for your kind attention and courtesy, I trust any remarks of mine will not deter others from using their best judgment to make apple culture a success in eastern Pennsylvania.

Mr. MEEHAN, referring to Mr. Engle's essay, thought this one of the most important questions we have before the Society, and one in which we should evince a deep interest. We have now a line of ocean steamers from Philadelphia to Europe, and although large shipments of apples are being made, they are chiefly New York fruit. When in England, found there a great demand for American apples. We must learn, however, how to pack well, and what varieties to ship. Pressure will not injure the fruit, unless the air comes in contact with the bruise. We must select those varieties which are solid, good shippers, and such as are not liable to rot. Found a good demand for Esopus Spitzenburg, Northern Spy, and Newtown Pippin, though the latter is not so good nor in such demand as formerly. Good apples, well packed, rather sweet and aromatic in flavor, will always find a ready market, at paying prices.

In regard to the planting and cultivation of orchards, would say that if some attention be paid to after-culture and treatment, it is not necessary to be so particular at first. Gave the following as his own experience:

Planted a variety orchard of dwarf and standard apple and pear trees, also peaches and cherries, all receiving the same treatment, and doing equally well. So long as stagnant water will not remain almost any soil will answer. Prepared the ground by plowing down sod, and planting potatoes. After digging the potatoes, it was sown in rye, and trees planted in rye stubble. Holes were made, not over eighteen to twenty inches wide, and trees of different ages and sizes planted, without any spreading of roots or special care otherwise. Two common laborers did the work, and not very carefully at that. The following spring a little manure was placed around each tree, three or four feet from the stem. The next season a crop of grass was cut, and more fertilizer applied a little further from the base of the trees. Think there are no finer, healthier trees in the State. Have grown three to five feet, and some even six feet the past year, dwarf as well as standard. Had some trouble two years ago with scale louse, but a washing with linseed oil destroyed it entirely. For the borer follows the trees in June, and destroys the eggs. Thinks this plan of preparing and cultivating orchards much cheaper than the usual methods, and equally satisfactory in its results.

Mr. SPROUT was happy to hear Mr. Meehan's views, and, in the main, agrees with him. Have tried different methods, but have lost many trees by blight. There is one principle we cannot gainsay; that is, that nature is a safe guide, and Mr. Meehan, as nearly as possible, follows it. By providing a mulch, he applies the best kind of fertilizer for the tree. In our valley, the past year, fruit was a failure, though Sullivan county was favored with a crop. Saw wagon loads of apples from there, on their way to Williamsport. They were generally in wagon loads or open barrels, and in bad condition for keeping. Three years ago, I visited western New York, and saw how they handle apples there. They always have new barrels for their fruit, and of uniform size, one hundred quarts being a legal barrel. Was there about the 6th to 8th of October, and they had just commenced picking Baldwin and Greening, and some complained that they were then too green. On coming home, a few days later, found the same varieties, in this vicinity, nearly all on the ground.

Mr. **Balderston** thought nature not always a correct guide. Crab apples are a natural fruit, and we want to improve on them. We must improve on nature if we want good apples.

Mr. **Cooper** inquired if nature did not also produce the Seckel pear.

Mr. **Ellis** gave his experience with some varieties of apples. Can't raise Bellflowers on his farm, worth a cent, but the clay soil in the vicinity of Muncy was the soil of all soils for that variety. Would like to know what two or three varieties of winter apples could be named, as suitable for this locality. Rambo is about one in six a No. 1 apple. Rest are good only for cider. Baldwin succeeds tolerably in this county, but should be planted on the ridges. Northern Spy will not keep. King of Tompkins County a failure. Planted liberally of this sort, but they rot on the trees. Wagoner is one of the best keepers, being good until February. Thus far we have but few varieties that can be relied upon.

Mr. **Sprout** is not opposed to cultivating orchards when young. In the vicinity of Lockport, New York, and Lake Ontario, the custom is to cultivate with hoed crops (not grain) until eight or nine years old, then turn to grass, to bring trees into bearing.

Mr. **Meehan** wished to add a word of caution, in regard to the use of linseed oil on trees. It should be pure, and not adulterated with petroleum, which will kill trees.

Mr. **Miller**—Much interested in this discussion. Thinks Mr. Ellis' experience of much value. He tells what varieties succeed here, or rather what do not succeed. Mr. Meehan's plan of non-cultivation is really the best kind of cultivation. In regard to following nature as our guide, we cannot carry out that principle, as nature does not plant trees twenty-five to thirty feet apart.

Mr. **Lint** has noticed some peculiarity in the growth of the Wagoner tree. Finds the top branches have a tendency to die, and new branches start out from below. We should report our failures as well as successes.

Mr. **Ellis**. It bears as profusely as the Damson plum. Fruit hangs, as it were, in ropes.

Mr. **Lint**. It is a good keeper, lasting until March, and in flavor, superior to any other.

Mr. **Balderston**. Apples ripen two weeks earlier in Cecil county, Maryland, than here. Find fruit better colored as we go south. Here, in Pennsylvania, we find fruit medium, both in flavor and color. Saw Seckel pears at Richmond, exhibited by Mr. Leighton, that were equal to Duchess in size.

Mr. **Engle**. Mr. Downing gives Bellflower as a New Jersey apple, where it is a standard sort, and gives entire satisfaction. Planted some trees thirty years ago, that have borne but little fruit. Concluded that it wanted lighter soil, where it would make less wood growth.

Mr. **Thomas**. The Seckel pears exhibited at Baltimore, and referred to by Mr. Balderston, were of immense size; in fact, so large as to suggest doubts of their genuineness. Those who tasted them, reported them inferior in quality to smaller specimens.

Mr. **Engle**. It is a conceded fact that, in most fruits, we lose in quality what we gain in size. The same is true of the sugar beet, and it is, therefore, not advisable to grow for size alone.

Mr. P. J. Berckmans, of Augusta, Georgia, having contributed a very interesting and valuable paper on the "New Peaches," it was next read by the Secretary:

NEW PEACHES.

MR. PRESIDENT AND GENTLEMEN OF THE PENNSYLVANIA FRUIT GROWERS' SOCIETY: The subject which you have requested me to present to you, whether considered in its commercial or simply pomological, aspect, is, in either case, one of vast importance, and a gratifying evidence of the progress of American fruit growing. I am aware, that what I can say will not be preëminently new to any of you; but, residing in a section of this continent, which is considered as its best peach-growing belt, the results of our experiments with the newly-introduced varieties, may, perhaps, add additional information to that which you already possess.

ALEXANDER.—The first production in our State was in 1876, and, although limited to two or three localities, gave promise of valuable results. In 1877, this variety was extensively fruited; in many instances, in sufficient quantity to send it to market.

For middle Georgia, the first fully matured specimens were gathered on May 25, and the last on June 7. The bulk of the crop was in shipping order by the 28th of May. Thus the whole crop could be gathered in two or three pickings, or within a period of ten days.

As regards its merits, I would name the following points:

Size, large for so early a variety.

Color, bright and attractive.

Quality, very good, and much superior to Beatrice.

Productiveness.—Remarkable. Trees one year old, planted in February, 1876, produced as high as one hundred and forty-five peaches in May, 1877.

Carrying capacity.—So far as ascertained, from having sent several packages, by mail, upwards of one thousand miles, it stands the test very well—not a single specimen being damaged in transit.

AMSDEN.—Two years fruiting have not enabled me to discover any difference between this variety and Alexander. Rows of trees of each variety, both from the original sources, and planted side by side, produced abundantly. No difference is perceptible in growth, habit of tree, foliage, flowers, glands, or in the fruit, with the only exception that the size of Amsden average a little better than that of Alexander. The descriptive remarks given for the latter are applicable to this variety.

BRIGG'S MAY.—From a limited number of fruit produced in 1877, little difference in size, flavor, texture, and quality of the fruit could be discovered, when compared with Alexander and Amsden. The flesh is of the same peculiar greenish-white tint; texture also similar; sprightly vinous, and adhering much to the stone. Its maturity was also similar—last of May to June 2.

The only perceptible difference from the foregoing is in the foliage, the leaves being serrated.

It is evident that these three varieties have a common parentage, and are doubtless seedlings of Hale's early, as they possess many characteristics peculiar to that variety. These are as follows:

Lateness in blooming, size and color of the flower, peculiar texture and flavor of the fruit, and the flesh being partially adhered to the stone. These varieties are likely to prove only the beginning of an endless number of seedlings, which will nearly all be almost identical in quality and maturity. The lateness of the blooming period of the Hale's early will tend to this identical re-production, as there are few chances for cross-fertilization from the average other varieties, whose period of blooming is nearly, if not quite, passed when the Hales begin to expand.

Already are some new seedlings of Hales, originated in Mississippi, proving this supposition to be not hazarded.

EARLY BEATRICE—Still a desirable variety to fill the gap between the maturity of Alexander and Hales, but its small size will doubtless eventually cause it to be discarded. It is remarkably prolific, and therefore requires thinning. The best results have been obtained by planting in rich soil and thinning the fruit freely. It has the merit of ripening evenly and within a period of six to eight days, a very desirable feature in early varieties, as the whole crop can be marketed in two or three gatherings.

EARLY LOUISE—Has been uncommonly fine for the past season, and of excellent quality and appearance. Skin very thin and easily damaged, which renders this variety unsuited for carrying to long distances. Ripens regularly three to five days after Beatrice.

RIVERS' EARLY—Has steadily increased in favor for the past five years, and in point of size and quality equals the best peach of any season. The flesh adheres less to the stone than either the Beatrice and Louise, is more vinous, and of better quality. The skin is even more delicate than that of Louise, and the peach utterly unfit for market. As a fruit for home consumption, it is of surpassing excellence.

These six varieties have advanced the peach season fully two weeks since the advent of Hale's early. Still for market purposes the first four on the list are alone to be depended upon.

FLEITAS ST. JOHN OR LOUISIANA MAY BEAUTY.—This, although comparatively an old variety, is still but little known, and may thus take place in this list. It is the earliest yellow-fleshed peach known in cultivation, and ripens with the Early Tillotson, or immediately after Beatrice is out of season. It has steadily gained in the appreciation of orchardists. Size large to very large, eight to ten inches in circumference. Skin deep orange, covered with dark brown crimson, and a deeper colored cheek. Flesh yellow, juicy, melting, sub-acid, vinous. Quality very good, carries well, and is very productive.

GENERAL TAYLOR—An excellent showy cling-stone, ripening with Early Tillotson, and exceedingly profitable in the southern markets, where clingstones always command a good price. This being the best very early variety of that class yet introduced. Size large, skin red, with crimson cheek. Flesh white, tinged red, very juicy, vinous, and of high flavor.

TUSKENA.—Another very early cling-stone, ripening with above, or a few days later. Flesh yellow to the stone. Skin yellow, nearly covered with deep orange. Quality very good, vinous, and sub-acid.

THURBER—A seedling of Chinese cling, equal in size and fine appearance, but free-stone. Flesh melting, vinous, and high flavored, ripens in middle Georgia by middle of July. Tree an upright grower, differing in this from most of the offsprings of this strain, whose growth is straggling and irregular. In Mississippi this peach is becoming much esteemed, and is classed as superior in flavor to the Chinese cling. Its skin is delicate, still its carrying capacity is equal to many of the leading market varieties of its season.

In this connection I would mention that within a few years past, the original Chinese cling-stone has given many seedlings of great value for our climate, and we have now a regular succession of varieties of this excellent type to ripen from first week in July until after the middle of August. The sucession is as follows, and in order of maturity:

General Lee, *Stonewall*, *St. Mary*, *St. Catharine*, *Thurber*, *Elodie*, *Spotswood*, *Sylphide*, *Seedling of Thurber*, (this is a yellow fleshed cling, of exceedingly rich flavor,) and *Hermione*. All these are superior to the old Chinese cling, and not so much predisposed to decay as the parent variety.

Of the many early varieties introduced by Mr. Rivers, few are of any value, and all are superseded by Mountain Rose with which they nearly all ripen. Of this list, I would mention *Early Albert*, *Early Alfred*, *Magdala*, *De Hogg*, *Early Silver*. Among the varieties ripening later, the *Princess of Wales* is of surpassing excellence, but much affected by mildew, and often worthless from this cause.

The type known as *Indian peaches*, of which the *Columbia* is a well known representative, contains a large number of excellent sub-varieties both free and cling-stones. Of this strain we have varieties ripening from July 10 until October. I will mention the *Muscogee* as among the free-stone varieties likely to be of value for the Middle States. Fruit very large, dingy brown red, with deep stripes, and very downy. Flesh white, veined red, juicy, buttery, and very rich; pit very small. This variety carries exceedingly well to long distances. Maturity here, end of July to August 15.

The *Indian* type of peaches seems to be confined to the uplands of the middle portion of Georgia, South Carolina, and Alabama, where it attains great perfection, and it is doubtful whether satisfactory results would ensue from their cultivation in the northern States. Still they are worthy of a trial. Of this type there are many excellent cling-stones whose peculiar vinous flavor seems to be confined to this strain. The newest fine variety of this class is the *Raisin peach*, lately brought to notice in Coweta county, Georgia. Another type furnishes us with many valuable varieties; this is the *Heath strain*, rich in juicy and vinous cling-stones. Of these I would mention,

SHELBY CLING.—Originated in Alabama. Size, large; slightly oblong. Skin white, with a bright rich carmine cheek of most attractive appearance. Flesh, white, juicy, vinous—best; maturity, end of July.

ANNIE WYLIE.—Introduced by Doctor A. P. Wylie, of Chester, South Carolina, and one of the last legacies to horticulture from that eminent and scientific worker, whose recent decease will be a great loss to southern pomology. Many of you have doubtless seen specimens of the variety at the exhibition of the American Pomological Society, at Baltimore, in September, 1877, where its fine size and appearance created much attention from peach growers. Size large to very large; creamy white, with red cheek. Flesh white, fine grained, melting vinous; quality, best; maturity in South Carolina, beginning of September.

PICQUET'S LATE.—This variety has been grown for nearly twenty years, and is highly esteemed in sections of Illinois and California. Ripening here with Smock, its merits are so far superior to that variety as to have caused the Smock to be discarded. Size very large, skin yellow, with red cheek; flesh deep yellow, buttery and very rich. It has also the great merit of blooming later than most of our leading varieties, thus seldom missing a crop. It is, with *Hale's* early, the only variety which has never failed to produce fruit when all other varities failed from spring frosts.

This peach would likely be one of the latest which could be ripened well in Delaware or Pennsylvania. But should later varieties prove successful, I would name the following, which are all improved seedlings of *Baldwin's* late, and ripen here end of September to 15th of October:

ZELIA.—Large, skin white with red cheek. Flesh, white, juicy, vinous, and fine flavor; free-stone; end of September; quality, very good.

CORA AND OLGA.—Almost similar to above, but a few days later. And still later we have

DARBY CLING.—A pure white fleshed peach, ripening from October 15 to middle of November.

GOODE'S OCTOBER.—A red-fleshed cling of the Indian type, of fine quality, and ripening end of October to 10th of November.

In the beginning of these remarks, I referred to my residence in what is considered as the best peach growing belt of the Southern States. We have practically demonstrated our capacity to produce mature peaches from end of May to middle and end of November, or during a period of nearly six months of the year. This is one of the claims advanced, for the popular opinion generally conceded to this section. The others are in bringing the fruit to a degree of perfection seldom equaled in more northern latitude, or those bordering on the sub-tropical zone. How far, however, these claims may be substantiated in the estimation of our friends in Pennsylvania, must be determined by themselves, and I suggest a visit to middle Georgia from all of you during our peach season proper, which embraces the months of June, July, and part of August, where the greatest abundance of varieties mature, and I can assure you all that we shall welcome you most heartily.

Respectfully,

P. J. BERCKMANS.

AUGUSTA, GA., *January 5, 1878.*

Mr. ELLIS thinks "Hoopes" a superior apple for canning. Can be kept until May, without difficulty.

The PRESIDENT inquired if any one knew the origin of this apple.

Mr. ELLIS understood it came originally from Bucks county. Thought, however, that Downing gives it to Chester connty.

Mr. ENGLE has known this apple many years. Would not know now where trees can be had. Got some fruit in the Cumberland Valley a few years since.

Mr. HARVEY saw some trees on the property of Lukens Peirce, some years ago.

Mr. EVENDEN. Have been in this country twenty-three years, and have sold many trees of this variety. It bears every alternate year, and is one of the best winter apples in this section, keeping until May.

Mr. SPROUT has trees in bearing. One of the best varieties for spring canning.

Mr. ELLIS. It is much better buried than kept in the cellar.

The subject of peaches was resumed.

Mr. MEEHAN was surprised to see the peach so much neglected in Pennsylvania. In New Jersey, where the soil is lighter, roots run deeper, and cultivation is doubtless beneficial, while in the heavier soils of this State it is safe to let the surface soil alone. Trees have borne abundantly for three years under his system of culture. In the flats adjoining the Susquehanna, they will doubltless do well by cultivation.

Mr. ENGLE is satisfied that peach culture can be made profitable in this State. We might as well export peaches as to bring them here from Delaware. Have grown fine peaches on the hills along the Susquehanna river. Saw enormous crops in the Cumberland Valley grown on poor soil. Had hoped, ere this, to see peach culture more of an enterprise in this State. Our Pennsylvania peaches always out-sell all others in the markets, but our great disadvantage is the cost of transportation. As to experience with the new early peaches, has only fruited Alexander in comparison with his own seedlings. Thinks Wilder will fill the gap between Hales and Alexander. Downing and Saunders have thus far proved earlier than Alexander. It seems Hales succeeds better south than here. As Mr. Berckmans suggests, think these early peaches all over the country are descendants of Hale's early. Has planted an orchard containing trees of about all the early sorts, and will be able to report definitely in a year or two.

Mr. THOMAS. Notwithstanding Hale's rots badly elsewhere, in Michigan it is one of the most reliable varieties.

The PRESIDENT hoped Mr. Evenden would give some information concerning the Lycoming grape.

Mr. EVENDEN has had it about seventeen years. In appearance it is like Red Hamburg. Have three acres planted in grapes, one half an acre of which are Lycoming.

Mr. ENGLE inquired whether it has been fruited outside of his grounds.

Mr. EVENDEN.—Some have been fruited in New Jersey, and also in Philadelphia, and did well.

Mr. CHASE inquired its season of ripening.

Mr. EVENDEN.—About the time of Concord. It is about the size of Concord, or a little larger. Salem also does well here, but must protect in winter.

Mr. ENGLE suggested that before adjournment we select a place for the holding of our next annual meeting. The question is, where can we meet to do most good and get most members? Has always been in favor of coming westward to hold meetings; but, if we cannot get accessions to our ranks, the feeling is in favor of staying nearer home.

Mr. COOPER proposed Lancaster.

Mr. THOMAS named Reading. It seems we came too far west this time. Have gotten, thus far, but one new member.

Mr. ENGLE suggested Harrisburg.

Mr. SPROUT. Am glad to have the Society meet here, but much disappointed in the local attendance.

A vote being taken, Reading was selected as the place of our next annual meeting.

Mr. ELLIS felt very anxious to have the Society meet here, and had strongly urged them to come, but felt mortified and ashamed to see so few in attendance. Have hardly been in the county during the past month, and fear our citizens have not been posted concerning the immense amount of talent here, and the pleasure to be derived by attending these meetings.

Mr. FORESMAN. Lives here, and is pretty well known, but did not know the business of the meeting, nor any of its members. Met Mr. Calder, who told him about it, and invited him to attend. It is hardly fair, therefore, to cast any reproach upon the citizens. If ladies were expected to be present, a committee should have been appointed to explain the nature of the meeting, and invite them to its sessions. Many, doubtless, thought it was a private meeting. This is not a public place, but a private hall, and himself did not know its sessions were free to all. If this Society had held its meetings in the court-house, people would have felt free to come. He hoped the Society would not go away from here, shaking the dust from their feet.

Mr. SPROUT did not intend to censure the citizens here for not attending our meetings. Could not admit, however, that it had not been sufficiently advertised. Has talked it all summer.

Mr. ELLIS censured, not the citizens, but himself, for making such an effort to get the Society here.

Mr. MEEHAN thought it natural that some should be dissappointed with the small attendance here, but felt that it could not be attributed to any lack of interest. It was evidently owing to a misunderstanding, and not to any neglect on the part of any one.

Mr. **MATTHEWSON.** Mr. Sprout did best he could. Met with much difficulty in securing a suitable room, Has seen a number of citizens, and the general impression is that the sessions are private. If the court-house could have been procured, there would have been a good attendance.

Mr. **ELLIS** made personal application to the commissioners for the use of the court-house, and was refused. The teachers' institute was also refused admittance, and passed a vote of censure.

Mr. **FORESMAN** was satisfied the committee did best they could in the way of securing a room. We have no public hall here, except the court-house, and this is the best room that could be gotten in the city. It is a splendid room, but never knew of a public meeting being held here. The only way to get ladies and gentlemen here, would be to appoint a committee to see the ladies, and extend a special invitation. Our citizens show deep interest in fruit and floriculture, and we usually have as large and fine horticultural exhibitions in this county as any in the State.

Mr. **COOPER** sees no reason to censure anyone. We have a very pleasant room for our meeting, and the proceedings interesting and instructive.

The **PRESIDENT** thought no censure due anyone. The Society has long felt a desire to meet in this section of the State, and was happy to embrace this opportunity to do so.

Adjourned to half past seven o'clock.

EVENING SESSION.

The closing session of this meeting was made more than usually interesting and entertaining, by some remarks by **THOMAS MEEHAN**, editor of the *Gardeners' Monthly*, on the subject of

HORTICULTURE IN ENGLAND.

We regret, exceedingly, our inability to report his remarks in full. He stated, among other things, that, to him, the whole country of England seemed to be a garden, It seems a nation of gardeners, and every humble house or cottage seems to have its garden. Native trees there are smaller, or rather shorter, than our own forest trees. Their trunks are stouter, and the branches seem to spread more. Have frequently noticed stems fifteen to eighteen feet in circumference, and measured a few that were twenty feet.

It is remarkable what pride and interest the nobility take in their parks and gardens. Even the Queen may be frequently seen among the beautiful flowers and shrubbery of her private residence, at Osborne House, on the Isle of Wight. Many of the trees were growing on this estate when purchased by the Queen, but the larger proportion were planted by Prince Albert, or since it came into his possession. Had the privilege of visiting these grounds, and they were of special interest to me, as showing how rapidly trees could be made grow into beauty. Saw Cedar of Lebanon, which is considered a slow grower, over forty feet high. Many of these trees have been planted at different periods, by distinguished visitors, as memorials of their visit to Osborne. All the specimens thus planted are neatly marked with a painted label, at the foot of each tree, giving the name of the planter, the date and the event it is designed to commemorate.

Some of these have failed, but a majority are doing well, and are doubtless the source of much pleasure. These facts tend to show how gardening is with the English people—an almost perpetual occupation and pleasure. Have seen the Duke of Wellington, busy with saw and chisel, pruning and grafting, like a common laborer. There are horticultural, or, rather, cottage associations, which offer small prizes for the best gardens, and it is surprising to see the success which some achieve, with the limited opportunities at their command. One place, in particular, was visited, where a family, consisting of husband, wife, and six children, were able, from a plot thirty by one hundred feet, to keep themselves in vegetables and fruit. Every point of space is utilized, and three or four crops are made to follow each other, in succession.

Larger places afford more scope for display and variety, and I found many that were particularly interesting to me. We sometimes think, that in the United States, we have a poor climate, and that with a more favorable climate, our success would be easy. On the contrary, we have many advantages, especially in fruit culture. Peaches are grown in England only with great difficulty. Their trees are trained, fan-like, against southern walls, or grow entirely under glass. Apricots and grapes need the same careful culture, and also strawberries, of which a few only are raised, by covering with nets, to secure from birds and other destructive agencies. Their strawberries are usually larger and firmer than with us, but in flavor they are not superior to our best spcimens.

Grapes are generally grown under glass, and need more skill and care than here, owing to the want of sunlight.

In the culture of the apple and pear, the English do not succeed as well as we. The pear is usually trained on walls, and the fruit similar to that grown in California, but not quite so good in quality.

The public gardens of England are grand, and well worthy a visit. Even the botanic gardens show rare beauty of arrangement, and great variety of color and design. Grounds are thus made to appear much larger than they really are, and plots of eight or ten acres seem to contain thirty or forty. Much labor is spent on these gardens, and it is interesting to see how they are planted and arranged, and how soon they become a thing of beauty. Slips are set in boxes early in the spring, and when rooted are set out and kept from wilting, and in a very few days they are a mass of foliage and bloom.

Kew gardens are particularly interesting, and it is wonderful how popular they are with the people. Comprising an area of four hundred acres, they abound in rare as well as common plants. Besides specimens of plants from all parts of the world, there is here a library of three hundred volumes, a laboratory, in which lectures on plant life are given, and every convenience necessary for young men to experiment in botanical problems. The average daily attendance of visitors the past year was five thousand, and as many as twenty-five thousand have been present on a single Sunday afternoon.

Although beautiful and interesting to visitors, England differs in many respects from the United States. They have there much longer twilight, and in summer, scarcely any night at all. The long evenings are great aids to those who desire to work in their gardens.

Society there is also different from here. Generally speaking, here ladies are worked to death. They must have the best of everything to keep up appearances. Here fine houses and costly furniture are marks of gentility. There a well kept lawn or garden is a measure of gentility, and shabby gardens are seldom seen. Within their houses they often deprive themselves of such luxuries as paint, carpets, and table-cloth, preferring to display their wealth in their gardens, their Ivy-covered walls, their Honeysuckles, and their Holly. These are some of the characteristics of the old country, and can never be forgotten by those who have seen them. Indeed, if we take away its ruins, its ivies, and its lawns, England will have little to boast of, and but little to interest the pleasure seeker and tourist.

Mr. HILLER not being present, the following very practical essay from his pen was read by his son, Mr. P. C. Hiller:

INSECT AND OTHER ENEMIES IN FRUIT CULTURE.

Under the head of insects, we usually include all manner of creeping and flying things that are known to injure fruit, or fruit trees and vines. Such, for instance, as peach tree borers, apple tree borers, phyloxera, the various members of the aphis family, scale, red spider, cherry bug, pear slug, curculio, canker worm, codling moth, caterpillars, of many kinds &c., &c. Their name is legion, and they are truly formidable. But experienced and observing horticulturists have shown that these insects are not yet absolute masters of the situation. When we take into consideration the many enjoyments that fruit affords to a family, in the way of delighting the eye, gratifying the taste, and contributing to the health, we must come to the conclusion that it is worthy of a big fight to destroy these insect enemies. Commence with the tree borer. In the vicinity of Lancaster, the apple tree borer is so formidable that many persons have ceased to plant. It has been repeatedly shown that by tying paper around the base of the stem, the ravages of the borer can be prevented.

If the paper is tarred after being tied, it would last several years, but would, perhaps, better be taken off every September, to harden up the bark. The same remedy holds good for peach borers. One man can tie up several hundred trees in a day.

The scale or bark louse is effectually destroyed by a coat of raw linseed oil, or by a wash made of water, lime, soft soap, and a *little* salt. Caterpillars do their work above board, and if they are taken in time, they can be crushed out.

The curculio can be destroyed by the oft-described process of jarring them into sheets, or they can be driven away by a *persistent* use of whale oil soap, as per Professor Heiges' plan. Whale oil soap is also a remedy against aphides and slugs, and so is Paris green. Paris green is also said to be effectual in destroying the canker worm. I am happy to say that I have not seen it.

Codling moths are very destructive enemies. Feeding the fallen fruit to swine will lessen them materially, and I have no doubt, that the shingle and cloth traps would be quite effectual, if carried out by united effort.

Phyloxera is one of the worst fellows we have to deal with. He prefers darkness, and works under ground, where he is hard to reach. At present there is no positive remedy against him, and we must content ourselves with such varieties as do not suit his taste. Fortunately we have some varieties that appear to have that quality.

Troublesome and destructive as these insect enemies are, there are other things that are a greater hindrance to fruit growing.

Many of our finest apples, Smoke-house, Northern Spy, &c., rot prematurely on the trees. I think it has been satisfactorily shown, that the cause is a fungoid disease.

If the theory is correct, (and I think it is,) that fungus attacks only trees that have become weakened by want of proper plant food in the soil, then there should be a remedy.

If it were otherwise, all apples subject to this disease would become affected. But you find trees in the same locality that have sound fruit.

Chemistry ought to be able to show what constituents are wanting in the soil, and if it cannot, we must find out by our own experiments.

If we had no railroads to bring us the apples of New York and Michigan to our doors, we would soon know, "Necessity is the mother of invention," is an old saw that is not yet worn out.

The yellows in the peach is a fungoid disease. On new land you do not find it for some years after planting. Is this not another argument showing that fungus attacks only trees that are impoverished? In our orchard we did not see a sign of it for ten years after planting. We had some big crops, and I think we failed to apply proper and sufficient fertilizers. A few years ago the great bulk of the fruit ripened prematurely, and the trees had unmistakable signs of the yellows. As the idea was general that it did not pay to try to renovate an orchard in that condition, I gave one of my neighbors permission to dig up the trees for firewood, requesting him to leave a corner of about a hundred trees alone, thinking, as I had no other trees of bearing age, that we might have a little fruit for home use. He forgot all about the one hundred trees, and before I knew what he was about, he had chopped off the lower limbs, an average of fully half the tops. Got mad at the fellow, and would not let him dig them, thinking to do it myself. When spring came the trees were not dug for want of time. Sowed about six hundred weight of acidulated South Carolina rock on the patch, (about an acre,) and planted in potatoes. Got a respectable crop of potatoes, and better old peach tops you do not soon see. If these things can be done with old diseased trees, is there a reason why, as a rule, we should not be able to keep a healthy tree healthy?

The experiments of Doctor George B. Wood, reported in our transactions for 1873, show that soils deficient in alkalies grow sickly trees. In our session of 1875, Professor Heiges told us that yellows did not trouble his trees that were liberally treated with potassa. The same ideas have been again and again advanced by many other of our members. But it matters not how simple and effectual a remedy is, if it wants frequent repetition, we are apt to forget, and we are only brought to our senses when we see the ruin of our trees and fruit.

But these insect depredators and diseases mentioned, are still not the greatest drawbacks to fruit culture in southeastern Pennsylvania.

Our scientists tell us there is no climatic change—that there is no difference in the rain-fall, &c.

Last spring, at blooming time, our fruit trees were in splendid condition. Cherries, apples, pears, were covered with a profusion of bloom. The bloom came late, (all the more favorable,) but with the bloom came cold winds, clouds, and rain, and the bloom continued in apparent perfection for several weeks. For an off year, we had an abundant set of apples and pears. But such fruit, crooked, knotty, worthless stuff, that kept falling, so that by ripening time there was nothing left. May I venture to say the defect was owing to imperfect fertilization much more than to insects. The same condition of things may have happened fifty years ago, but they were then the exception, now they are the rule. In western New York and Michigan they rarely ever fail to have fruit.

The same held good in our section of the State, in the recollection of persons who are not yet classed among our old men.

Another point: Our fruit does not keep. The apple crops of 1872, and

1875, were large and fine, remarkably free from insects, but our winter's supply, as usual, had to come from other places. I have known Smokehouse, Bellflower, Paradise, &c., to keep until May, by ordinary treatment. That was many years ago. Now these varieties ripen on the tree before the usual picking time, and the few that hang to that time, require careful management to keep till Christmas. If the cause of these conditions is not climatic, I would like to know what is.

The fruit grower can do very little in overcoming these evils. The rain, and wind, and scorching sun, are not under his control. The only thing that presents itself to us, is that we look up varities that are late ripeners.

We have made but little progress this way.

York Imperial and Tewksbury Blush are indexes that point to the way.

We yearly have varieties brought before us, said to possess that quality, but it takes many years to test them, and they frequently do not uphold that character when transferred to other localities. If we find a variety on our own ground that comes up to these requirements, we must propagate it each for himself. Nurserymen's lists help us but little.

I do not claim to have advanced anything new in this rambling discourse. The ideas here set forth have again and again been brought before us, and I have repeated them because the subject is worthy our continued attention.

Mr. ENGLE.—We have hurried over business somewhat, and not fully discussed questions in their order. Any unfinished business of that kind might now be brought up.

Mr. SPROUT thought floriculture should be discussed by the Society.

Mr. HILLER asked whether tarred paper is injurious to green-house plants.

Mr. MEEHAN.—The use of gas tar in horticulture is very dangerous. It contains creosote, which is death to all plant life. Has seen trees totally destroyed by it. As a preventive of the borer, would prefer cutting out the insect in June to any application of that kind.

Mr. ENGLE has had some experience in the use of tarred paper. Applied it to some peach trees, and all were destroyed or injured so as not to be worth taking care of.

The following essay by Mr. Waring, of Tyrone, Pa., was read by the Secretary:

TYRONE, PENNA., *January 9, 1878.*

MESSRS. HOOPES BRO. & THOMAS: Your card of 12-7-77, was duly received. In reply to your invitation, I will offer a few thoughts. Age and aversion to winter journeying will prevent my attending the meeting of the fruit growers, even in Williamsport.

As the difficulties of fruit culture on the western prairies seem to develop there a very full knowledge as to what different sorts will endure different grades of climatic trial, so our mountain region furnishes, in its way, a rich field of observation and a great variety of cases; for both soil and air conditions are varied with us in every mile. This is obvious from a mere glance at the forest growth, which is seen to be composed of very different classes of trees in different situations, and chiefly in different *exposures*, for shelter and air moisture seem to have much more influence than the character of the soil. The bleak, exposed plateaus of high, wide, open valleys, although having even *rich* soil, present a native tree growth so like what we find on sterile mountain tops, that these fertile plateaus were long supposed to be valueless, and were called "barrens."

On the other hand, the trees that crowd in sheltered, humid mountain gaps, with such beautiful luxuriance of growth, are almost totally different, and more nearly like those found in the valleys of large streams. Evidently the differences in *air* condition between these localities are sufficient to determine the success or failure of any particular sort of forest tree. The *soil*, on the other hand, seems chiefly to affect the vigor of the growth; but unless it stimulates growth too excessively, it does not make a difference of life and death, excepting when it is too wet for the many sorts which like "dry feet," even when they enjoy having their heads bathed in more or less of vapor.

Most of our cultivated varieties of fruit have a greater nicety of constitution than the more robust trees of the forest, and accordingly we find many sorts successful in sheltered nooks, which fail altogether in exposed localities. It would be useful to collect and record information on this point, distinguishing between sorts that are found fruitful in company with the beech, the spruce, the elm, and ash, and other vapor-loving trees from those which do well where chestnut, hickory, pine, &c., are prevailing trees; and the sorts which succeed in both situations should be especially noted.

As a general rule, very few of the favorite fruits of the river valleys and and lake regions succeed in the mountain air. The Townsend, Smith's cider, Cornell's fancy, York Imperial, are among sorts famous where the conditions suit them, but which, among the mountains, almost totally fail to even show a sample of their fruit. The Blenheim Pippin, the Baldwin, the R. I. Greening, the Maiden's Blush, the Summer Pippin, are among sorts which have a hardihood of constitution which enables them to flourish and fruit in most diverse conditions.

The influence of the stock used enters into the question, and as we refine in our culture, we shall be obliged to take note of varieties which impart hardihood, and use them, as in Europe, where the difficulties of growing peaches, apricots, &c., oblige gardeners to select the one best individual variety of stock. Again: as some stocks are repulsive and others especially inviting to certain insects, as the borer, the scale, and the bark louse, there may be advantages obtainable in this important line, as a result of comparison and observation of the effects of different stocks. We may be able to turn off parent flies, when about to deposit eggs, by having stocks which rather deter than invite them.

Very respectfully,
W. G. WARING, Senior.

Mr. CARTER, of Chester county, offered the following; which was adopted unanimously:

Resolved, That the sincere thanks of this Society are due, and are hereby tendered, to the Lycoming County Horticultural Society, and to the citizens of Williamsport, for the corteous and hospitable manner in which they have treated the members of our Society, during our very pleasant visit here; and further, that our thanks are especially due to the owners of this very comfortable hall, for its use during our session.

Mr. ELLIS asked which is the best time to plant trees, fall or spring.

Mr. EVENDEN recommended spring, especially for peach.

Mr. BARTRAM also considered spring planting best for peaches.

Mr. ENGLE recommended either, or both, if done early enough. Trees planted early in the fall will become established and better able to withstand the winter. So with spring planting. If done early they are well established before the heat and drouth of summer are upon them.

Mr. MILLER. We plant in all seasons, if ground is in good condition. The month of December, 1877, was more favorable than any other month.

Don't expose the roots to cold winds nor hot sun. Sprinkle the roots when planting, and put dry earth around them, and failures are the exception. Referring to Mr. Hiller's essay on insect enemies, Mr. Miller stated that fruit trees are often attacked by red spiders. They will destroy trees sooner or later, but being scarcely visible to the naked eye, the loss is attributed to other causes. Cold water applied with a force pump, will destroy the insect.

Mr. **KENDIG** inquired whether any method can be suggested to make apple trees bear during the "off" year.

Mr. **ENGLE** was glad to have the question brought up here. Have seen the theory advanced, that by picking off, when the tree is young, a crop of fruit soon after it has bloomed, it will bear a full crop the following year, and alternate years thereafter.

Mr. **THOMAS.** Mr. Vickers, from Maryland, has sent to this Society specimens of apples from a tree, half of which bears a crop one year, and the other half the following year.

Mr. **ELLIS** asked how to prevent the ravages of the tent caterpillar. Some have recommended burning with coal oil.

Mr. **EVENDEN** destroys them with gun-powder.

Mr. **CHASE.** One year ago, in northern New England, this pest was very distructive. Forests even were attacked by them. Some trees were saved by picking off by hand. It continued about three years in New England, working its way east.

Mr. **HARVEY.** We should learn what insects are our friends, and what our enemies. The lady-bug, for instance, eats the eggs of the Colorado beetle. The amantis bug also is bred by some, and turned out to destroy mischievous insects.

Mr. **BARTRAM** inquired about the "basket worm," or "drop worm," as it is named by some. It inhabits its own house, and always takes it along when it moves. It is one of the most troublesome of pests to destroy.

Mr. **HOOPES.** It is called "basket worm," and is an intolerable nuisance. There seems no way of getting rid of it except by cutting or pulling off by hand, and burning it.

Mr. **ENGLE** has had considerable trouble with this insect. It attacked an arbor-vitæ windbreak, and we had some trouble to save part of it from destruction. We picked them off by bushels.

Mr. **COOPER** has had similar experience to that of Mr. Engle, and destroyed it by same means.

The time for final adjournment having arrived, and there being no further business, the President declared the meeting adjourned.

The following interesting essay was received too late to be read before the society:

FORESTS AND THEIR DESTRUCTION.

The planting of forest trees to supply the reckless destruction of the most useful and beautiful of earth's adornments, is an important question, indeed a question of great moment, and no one endowed with human beneficence, can for a moment doubt it. Bear in mind, we are not contending against the legitimate use of forests as an element of human consumption, for, in the ordinary progress of our race, that is a thing that must needs be; it is PLANTING, that is the burden of our theme. Whether we plant for the common wants of life; for shelter or protection; for ornamentation, or, perhaps, to secure a continuous or periodic supply of rain-fall. One twentieth, or at least one tenth, ought never to have been destroyed as has been, without having re-planted as much again. The nine tenths, remaining land, would have produced as much as the whole, without the forests. Three fourths of our forests are used up already, and the number of consumers is rapidly increasing. There are now about forty million of people in our country to be supplied. Judging by the past, this is certainly not a very encouraging prospect; if this waste is not checked, in fifty years hence our forests will be entirely exhausted. The demands of Pennsylvania alone, will require about ten billion feet of lumber for fencing, and about twelve billion for building purposes.

It will require about ten billions for furniture and wages, besides ties for four thousand miles of railroad—two thousand five hundred to the mile—making about thirty billion feet to be provided for, sooner or later, and this to be periodically replenished. Nor is it the woodman's ax alone that is devastating our forests. Times' relentless scythe cuts down the aged; winds and frosts prostrate many of the huge and valuable denizens of the forest, and others fall a prey to "devouring worms." Thus nature may exhibit the proportion that may be legitimately removed, and suggest that nothing but a new tree planted, will reinstate an old one destroyed. Nothing can be adduced in extenuation of our profligacy to our posterity, in not husbanding our trees, or in not replacing those that necessity compelled us to destroy. Look at the effects upon older countries in the devastation of their forest trees. This ought to be enough to induce every thinking man, and every social organization, to do their utmost for their protection and economization. Palestine, Syria, Egypt, France, Italy, and Spain, history tells us, have witnessed their most populous regions turned into forsaken wastes, and their best lands turned into sterile deserts.

Honorable J. P. Marsh, is of the opinion that the exhaustion of our forests, from the wanton destruction of our valuable trees, is fifty or one hundred years nearer to us than people generally think. It is useless to talk about planting a few shade trees, on a few acres, by a few individuals, when we annually hew down and destroy the products of millions of acres of our most valuable timber lands. Men talk about soft wood that will spring up and produce forests in ten, fifteen, or twenty years, which, however, will only answer for shade, for wind-breaks, or for some ordinary contingency, but this will never supply the exhausted oak, hickory, mahogany, and other hard woods which require three or four generations, or about one hundred and fifty or more, years to mature; all of which are worth from forty to sixty dollars per thousand feet, right here at our doors, and much more in Europe, where it is in great demand.

Many acres of forest in Lancaster county will readily bring $100 "wood-leave," and many single trees have brought as high as fifty dollars. Some of these forest kings are extra large, showing one hundred and fifty rings, indicating that they at least have attained that number of years. Companies can accomplish more than individuals, and governments can do more than companies. A number of our State governments, as well as a number of our agricultural societies have offered trifling premiums, as inducements for land owners to give some attention to silviculture. Congress also offers to donate forty acres to any responsible person who will improve a whole section, under certain circumstances, including the planting of trees where none exist. This cannot be regarded as a very tempting inducement to any people except those of the very poorest class, as it would require many generations before they could expect a return of good and solid timber, whilst other crops could be realized within a year. Congress should immediately organize a *Board of Commissioners of Forestry*, who should plant, or cause to be planted, whole sections all over the prairie country in forest trees, or give the land away to be planted by individuals, who, if they were not themselves specially benefited, would certainly have the land in such condition as to make it a desirable inheritance to posterity. This would be better for the country than their schemes of "currency tinkering," intriguing for the "presidential succession," subsidizing monopolies, and "gasing" about pseudo-reform.

The Commonwealth of Pennsylvania should encourage individuals and companies to plant, preserve, and protect forest lands. Cultivated timber should be exempt from taxation, and as many acres planted annually, as are cut down and consumed.

As early as 1589, Bernard Palliory, a distinguished Frenchman, said: "I cannot sufficiently detest the act of cutting away our forests, without re-planting them, and I call it a curse and calamity to France; for, if our forests are exhausted, all interests of the country will be materially affected."

Mr. Starr, of St. Louis, in 1865, said: "There are about sixty occupations enumerated in the last census, which depend, in whole or in part, on lumber, or wood, as their raw material, in their commerce and manufactures, employing five hundred thousand artisans, of various kinds, and representing two million of people. It is useless to talk about individual enterprise in planting forest trees, as their efforts would only be a drop added to the sea. Let our legislators be prudent, and 'cast their bread upon the waters, and it will return after many days.'"

In conclusion, let me exhort the Society to use all honorable means to induce our Legislature to pass a judicious law in behalf of our forests, and to encourage silviculture. It is written: "Whoever pretendeth to believe, and provideth not for his own household, is worse than an infidel."

P. S. REIST.

WARWICK, LANCASTER, *January 14, 1878.*

The following communications, in reference to a new insect enemy of the peach tree, in Reading, Pennsylvania, were received during the sessions of the meeting. Specimens of the insect referred to, were received and exhibited before the Society, but no one present having seen or heard of it before, no remedy could be suggested. The insects were subsequently sent to our entomologist, Mr. Rathvon, who has thrown some light upon it:

READING, PA., *January 13, 1878.*

E. B. ENGLE:

Dear Sir: Inclosed please find an article which I had prepared for your Society, and which I had addressed to, and expected to send with, Mr. Rathvon, but he does not expect to be present, and has advised me to mail it to you. Hoping you will bring it to the attention of the Society,

I am yours, respectfully,

W. M. YOUNG.

The following is an extract from the letter referred to above:

READING, PENNSYLVANIA, *January, 1878.*

Mr. S. S. RATHVON:

DEAR SIR: Five years ago, I had the opportunity to discover, on a few peach trees in the central part of the city of Reading, a new insect, which, to my knowledge, has never been known here before. The first year, I visited various sections of the city, to discover, if possible, whether it had spread any. I found none elsewhere; and I gave notice to people then, that, if not exterminated, it would become a great evil to peach growing. This year, I find all my bearing trees afflicted, as well as my neighbors', and, I do believe, that it will become, in a short time, of great magnitude, and no rest until it has destroyed the trees in general. Its increase in one season is enormous, as the insect which lays the brood can fly. I am at a loss for a remedy.

I send you a few branches of the afflicted peach, which is a semblance of how all the branches of bearing trees are at present. Also, I send you one of the insects that lays the brood. Several trees have been totally destroyed by this insect.

Can you give me the name of the insect? Its nativity, or where first seen? Has any other member any knowledge of it? and are there any other districts infested by the same? Are there any possible remedies at hand? If a remedy, can it be applied without destroying bearing trees?

Yours fraternally,

W. M. YOUNG.

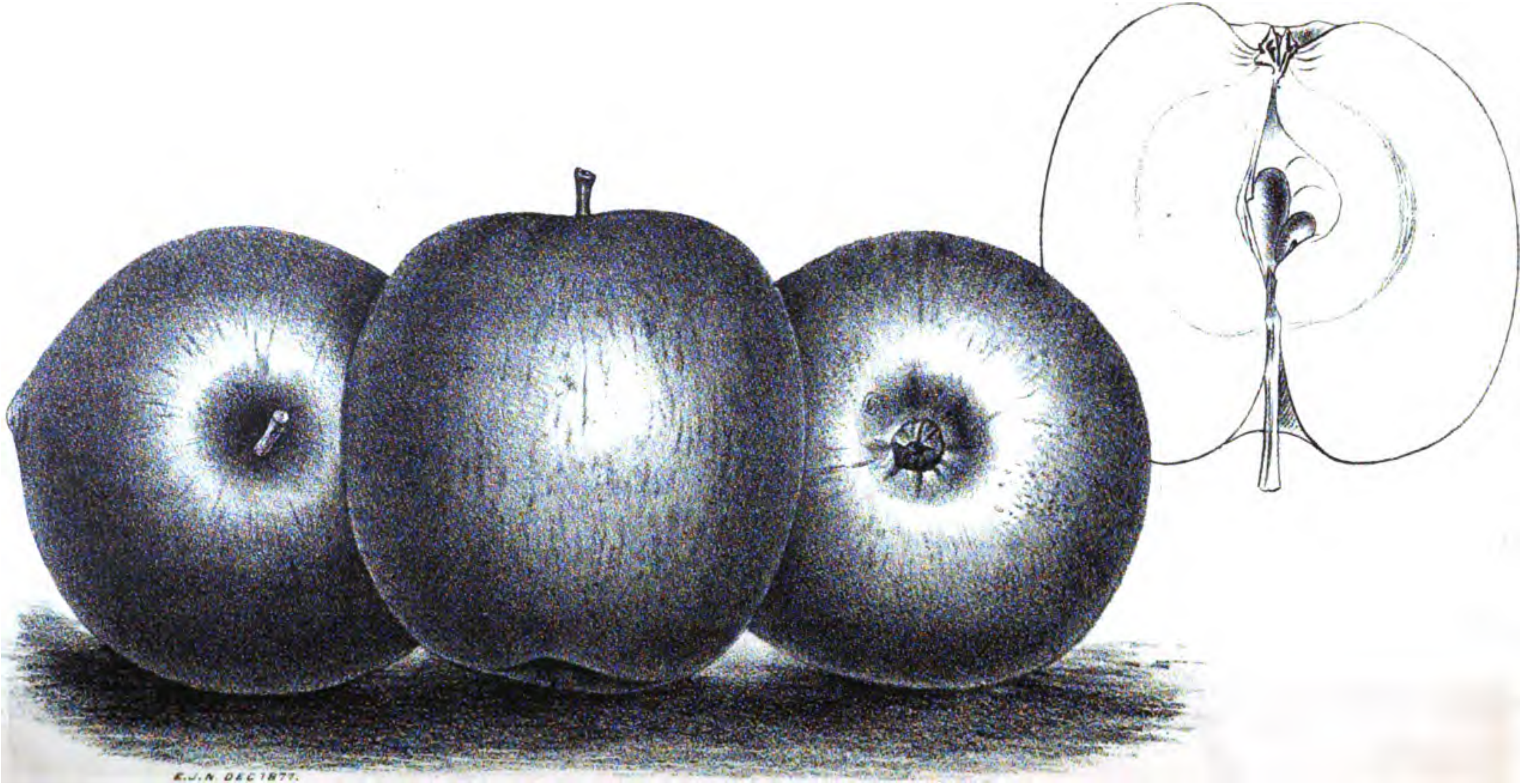
The following, from the *Lancaster Farmer* for February, 1878, are Mr. Rathvon's views concerning this new enemy of the peach:

"We insert these letters here, not for the purpose of criticising the misapprehensions, and consequent misstatements of the writer, but to illustrate, from his own experience, and his own practical observation, that he has a very formidable insect enemy to his peach trees to contend with, and to elicit the observations and experiences of others on the same subject, if there should be any within our State or elsewhere. But, first, we would most respectfully beg leave to correct a great error, which he seems to have fallen into, in regard to the winged insect which he alleges lays the eggs.

"The delicately formed golden green insect, with the beautiful lace wings, belongs to the order Neuroptera (nerve-winged insects,) and the family Hemerobudæ, and is one of the most industrious and unequivocal insect friends that belongs to the whole class insects. The nimble little larva is spindle-shaped, oblong, thickest in the middle, and tapering towards both ends, has six feet, and a formidable pair of calliper-like jaws, and feeds mainly on aphids and bark-lice, before the latter have assumed the scale form. After the larva is mature, it spins itself up in a small spherical. whitish, silken cocoon, from which the perfect insect evolves in the late spring; and when the female becomes fertilized she deposits from ten to twenty eggs in a cluster, each one on the end of a delicate white foot-stalk, when they look like a minute bulb on the end of a thin, whitish bristle; and when the young are excluded from the eggs, they crawl down the foot-stalk and scatter themselves over the tree or plant, and go in search of any small living object they can find, especially plant or bark-lice. The specimen inclosed, still has the cocoon within its grasp, from which it emerged. This little insect can do no harm whatever, for in the winged state it partakes of no food at all, indeed, it could not if it would, for its mouth organs are obsolete, or merely rudimental. It has no part whatever in producing the bark-lice that infest the branches of the peach or any other tree, and its presence there is solely for the purpose of feeding on them. We have watched them for many an hour among colonies of *aphids*, slaying them with the energy of a regular pork-butcher. Knowing them and their habits so well, we regret that their mission has been misapprehended, and hence, altogether misrepresented. This little subject seems to be *Chrysopa occulata*, but there are some twenty or thirty described species of them.

"And now a word about the 'bark-lice' of the peach tree. They belong to the order Homoptera (like winged insects) that is, in those among them that have wings at all, the wings are all nearly or quite alike in size, structure, and form. But it is only the males that have wings, and these do not survive the winter. Those on the twigs of trees at this season of the year, are all females, and all will, next spring, deposit a number of eggs, (each from fifty to one hundred and fifty or more,) and these will hatch about the 15th of June—earlier or later, according to the temperature of the weather. They are so very small when they come from the eggs that they cannot be discovered without the aid of a glass, but small as they are, they have organs of locomotion sufficient to transport them all over the tree, and wherever the wood is smoothest, newest, and most succulent, there they will penetrate the bark with their piercers, and permanently locate themselve, and begin to suck and thrive on the yielding sap. After they select a location and affix themselves to it, they never leave it alive. All the males do is to fertalize the females, after which they very soon die. When the female is located, she divests herself of her feet, her antennæ and her caudal filaments, and becomes degraded into a 'scale' or 'scab,' and hence they are called 'scale-lice,' or 'scab-lice.' No matter how cold or how wet the winter is, the weather has little or no injurious effect upon either the female or her eggs. There is but one brood in a season, but they are so prolific that in one or two years they overrun very large trees, and very large districts. They are supposed to be carried from tree to tree by the prevailing winds.

"The 'nativity' of this insect may be foreign; at all events it does not seem to be very well known in this region of the country. In 1860, whilst in attendance at one of the early meetings of the Pennsylvania Fruit-Growers' Society, held at West Chester, Pennsylvania, a gentleman in that town brought us a plum branch infested similarly to your peach trees. But, it being early in the month of June, (the strawberries were just ripening,) of course, they were much larger than yours are now. Since that time we have not seen any that seemed a nearer resemblance to them than some sent to us on one occasion on a beech twig. They belong to the family Coccidæ, and may be referred to the genus *lecanium*. If not the same species that the pear and the plum are sometimes infested with, then they may receive the specific name of *persicum*. Whether any other member of the Society has noticed them, is more than we can say at this time. Nor can we answer whether any other district in the State is infested with them. As to the possible remedies for their destruction, in the condition they are now, scattered over the whole tree, even to the ends of the smallest branches, it would be difficult to apply it, even if it were known, and might do little good if applied. On the trunks or larger limbs they can be dislodged with a stiff brush and soap and water; or by whitewashing; or by an application of oil or other fatty matter. If, by close observation, the time could be discovered when the young come forth from the eggs, and before they have located themselves, (about the middle of June,) and then the trees were drenched with soap and water, or an infusion of tobacco, they might


E.J.N. DEC 1877.

DICKINSON APPLE.

all be destroyed. In addition to this, encouaage the 'lacewings,' the 'lady-birds,' and other insect friends, and to a limited extent these will greatly aid you in the work."

REPORT OF COMMITTEE ON NOMENCLATURE.

To THE PRESIDENT OF THE PENNSYLVANIA FRUIT GROWER'S SOCIETY: In the discharge of its duties, your committee meets with the same labors and difficulties which it encountered in former years, not from want of material to work upon, but from want of reliable data to make up a report becoming this society. It is now generally conceded that our State has fruits of all kinds, and of such merit that would make her almost independent of other sections, provided the best were fairly tested and properly disseminated. The many inferior fruits that are growing simply because they are well known in a certain locality, or, because the fathers had them in their orchards, greatly bars the way to the introduction of a better class of fruits; at the same time very valuable kinds have been fruiting for a generation or more without being known much beyond their native localities. It is gratifying, however, that with each succeeding year some of our fruits of merit are brought prominently before the public, among which are York Stripe, Dickinson, Herman, Strinestown Pippin, Cumberland Seedling, and other apples; Sener peach, Lancaster and Hoke cherries, Sharpless strawberry, with quite a list of new peaches, grapes, raspberries, and strawberries from other States.

The great number of new seedling which are continually brought out by hybridization, cross fertilization, in addition to the many natural ones, tend to accumulate to such an extent that will eventually make our catalogues and books on fruits too cumbersome, besides embarassing, those not well posted. It is, therefore, important that pomologists generally, and nurserymen in particular, should guard against the admission of fruits into their lists or catalogues that have no merit. On the other hand, no effort should be spared to discard and strike from our catalogues all inferior fruits, at the same time dropping as many synonyms as possible.

Your committee deem it not superfluous to again call attention to the naming of new fruits, that all superfluity of name should be avoided, making the name as short and convenient as possible. We also regret, that on account of the annual report being issued earlier than usual, drawings of several fruits that were intended for this issue must necessarily be deferred for a future report. We would call special attention to the descriptions of new fruits accompanying this report.

Respectfully submitted.

H. M. ENGLE,
CALVIN COOPER,
J. H. BARTRAM,
A. W. HARRISON,
J. W. PYLE,
Committee.

DESCRIPTION OF PLATES.

Sharpless Seedling Strawberry.

SIZE.—Large to very large, specimens measuring from eight to ten inches in circumference, and weighing from one a half to two and a half ounces.

FORM.—Generally oblong; sometimes compressed or coxcomb shape.

COLOR.—Bright red, with a smooth, shining surface.

FLESH.—Firm, sweet, with a very agreeable aroma, and of first quality.

PLANT.—Vigorous, hardy, and productive.

It has been pronounced, by good authority, to be the largest and finest strawberry in cultivation, which, however, should, and, we trust, will be confirmed by being further tested. This strawberry was originated, in 1872, by J. R. Sharpless, of Catawissa, Pennsylvania.

Sener Peach.

SIZE.—Large to very large.

COLOR.—Yellow, with a deep red cheek.

FORM.—Almost spherical.

FLESH.—Yellow, deep pink around the stone.

SEED.—Quite free, rather flat, and small in proportion to the size of the fruit.

QUALITY.—Sweet, with a rich aroma; juicy and melting; one of the best of its kind.

It received the most marked attention at the centennial by the judges and others. Originated by Gottlieb Sener, of Lancaster, Pennsylvania, nearly forty years ago, and held its integrity from seed for three generations, with scarcely any variation, during which time it has been bearing full and regular crops. Should it prove as valuable elsewhere as in its native place, it will be a worthy acquisition to our list of peaches.

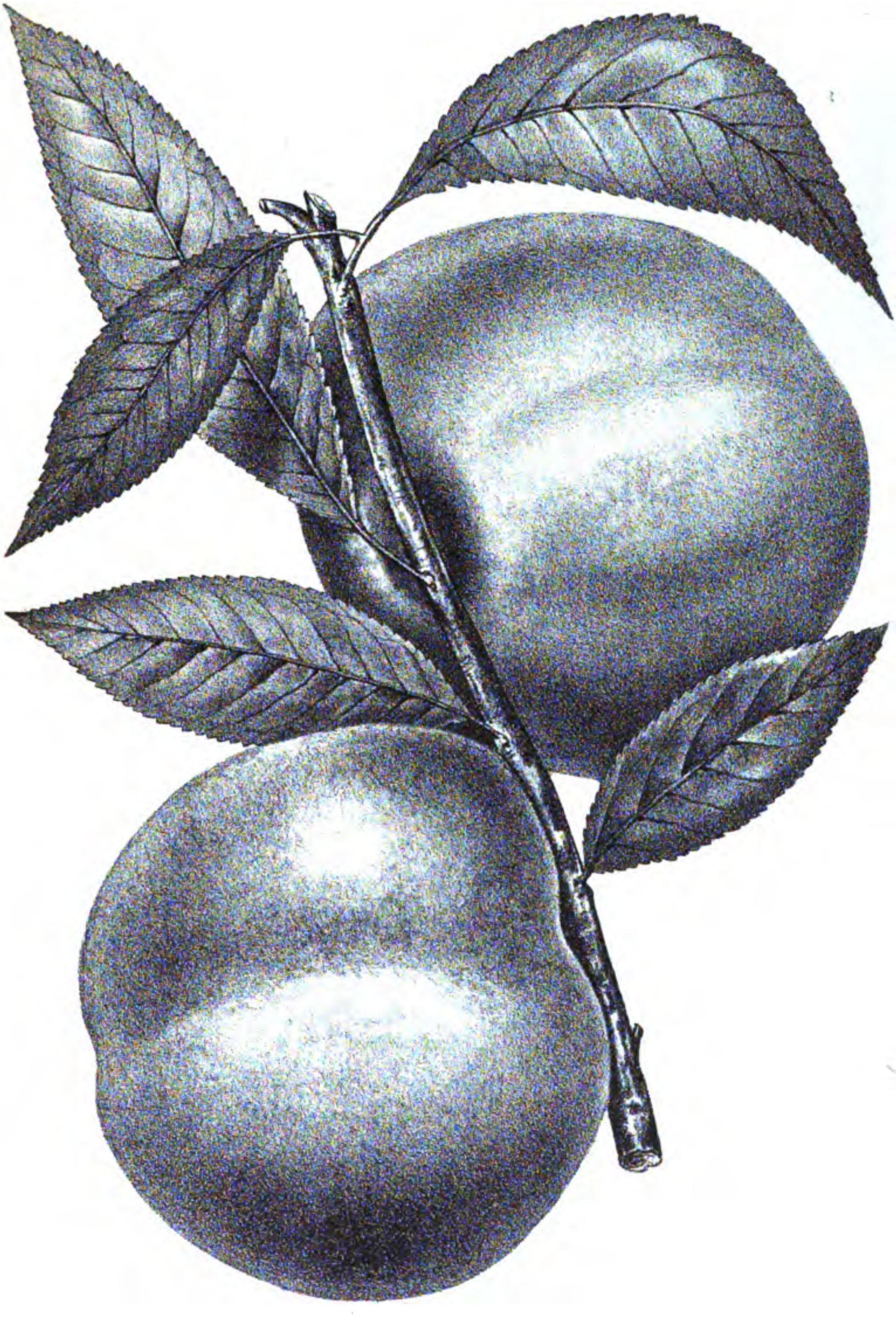
Dickinson Apple.

Originated in West Chester, Pennsylvania, from seeds of the Belle-fleur, planted by Sarah H. Dickinsen several years since.

Fruit, medium to large; ovate, inclining to conical. Cavity, deep and acute; basin rather broad, furrowed or ribbed. Stem of medium length; slender. Calyx, large; closed. Color, yellow, almost covered with faint streaks and marblings of red, deepening, on the sunny side, to dark red, with numerous confluent blotches of minute dots near the base. Texture, breaking, fine, crisp. Flavor, mild, sub-acid, and agreeable; very juicy. Very good. Tree, a prolific and regular bearer; an irregular but vigorous grower; not yet disseminated. Promises to be a valuable winter fruit for eastern Pennsylvania. Season, January and February, but will keep into March.

Lancaster Cherry.

This is an accidental seedling, orginated and fruited for several years by Daniel Smeych, of Lancaster, Pennsylvania. It has proven an enormous cropper in its native place, and one striking feature is its ripening period, which is fully four weeks. It appears to be a blending of the Heart and



THE SENER SEEDLING PEACH.

FROM SPECIMENS RAISED BY DANIEL SMEYCH, LANCASTER CITY.

Bigarreau classes. Size, large; color, red; slightly heart shaped; flesh moderate, firm, and juicy. Sweet, with a slight acidity that is rare in cherry of its class. It is simply of first quality. The accompanying drawing is from a branch that overbore, and therefore below the usual size.

PINUS PUNGENS—THE TABLE MOUNTAIN PINE.

By THOMAS MEEHAN, *Professor of Botany to the Society.*

About the latter part of the last century our country was visited by a distinguished botanist, Andre Michaux, and his son, F. Andre Michaux, no less distinguished than his father, and the two together traversed the continent in search of its floral treasures. In 1801, the father published his work on the "Oaks of North America," and in 1810, the son published a "History of the Forest Trees of North America," and it was in this work that we were made acquainted with our "Table Mountain Pine." He gives a very fair colored plate of a branch with a cone, and says of it: "The Table mountain, in North Carolina, one of the highest points of the Alleghenies, at the distance of nearly three hundred miles from the sea, has given its name to this species of pine, which covers it almost exclusively, though it is rare on the neighboring summits, nor is it found in any other part of the United States, as my father and myself have become assured by extensive researches; of all the forest trees of America, this species alone is restricted to such narrow limits, and it will probably be the first to become extinct, as the mountains which produce it are easy of access, are favored with a salubrious air and a fertile soil, and are rapidly peopling, besides which their forests are frequently ravaged by fire."

It is of interest to note that botanists of the present day do not talk as positively as those of the past. The more we learn the more uncertain we are that we have learned all, and if any one now were to say that such or such a plant did not exist, because his "extensive researches had assured him of the fact," even in these days of railroads and steamboats he would be thought rash. In the case of this pine, instead of being confined to the Table mountain, it has been discovered in various places along the whole Allegheny range, in spite of the extensive researches of our distinguished friends of the past age.

It is now many years ago, when on a botanical excursion, with the President of our Society, Josiah Hoopes, we were told by an aged botanist of Bethlehem, on the Lehigh, that he had, many years previous to our visit, found some half decayed cones of *Pinus pungens* on ground that, in his boyhood, was a pine forest; and subsequently to this, Professor T. C. Porter, the distinguished botanist of Easton, found old cones at Huntingdon. Then the writer of this found the living trees in great abundance near Port Clinton, on the Schuylkill; and a few years later, when attending the annual fair of the Pennsylvania State Agricultural Society, was surprised to find most of the greens used for decoration of the same pine cut from the hills near Harrisburg, where, a year or two later, the writer saw them in the woods in great quantity. Again, in company with President Hoopes, it was seen, in great abundance, in the Shenandoah mountains of Virginia. At any rate, it is fair to say that its range is from North Carolina to northern Pennsylvania, and we may claim it, notwithstanding its name, as a Pennsylvania tree.

Michaux says it grows about forty to fifty feet high, and this accords with my experience. In our mountains it is generally associated with *Pinus inops*, and seems to grow at about the same rate. Michaux thinks it is of little use in the arts, as compared with other timber trees of the pine family.

Plants, however, which I have raised from seeds of our Pennsylvania plants, show me that it is an immense grower. It has sometimes increased in diameter an inch and a half a year, and, as it has a very strong and deeply penetrating tap root, I believe it would be a capital tree for planting in the dry western lands, where timber is hard to grow, and consequently very scarce. It may also be excellent for clothing with vegetation, dry, rocky, mountain tops, in other places, where few things will do at all, and any kind of tree is a blessing without disguise.

For ornamental purposes, however, few pines are more desirable. Its bright green color is retained at all seasons, not changing its tint, in winter, as some do. Its rapidity of growth would render it liable to a straggling appearance, but it takes to the pruning knife so well, that one can make it of any form desirable. But the large cones are particularly ornamental, and these are produced while the trees are yet young. Indeed, I have seen a few bear them at three years old. The male flowers, produced in early spring, are more than usually attractive for one of the pine family, through a beautiful purple tint they bear.

It seems but right that on a Pennsylvania society should fall the duty of making known Pennsylvania trees, which, in spite of its North Carolina name, we must justly regard it; and especially pleasant is it to me to help the Society in making it known, since it fell to my lot to be the one to discover it.

Fig 1.

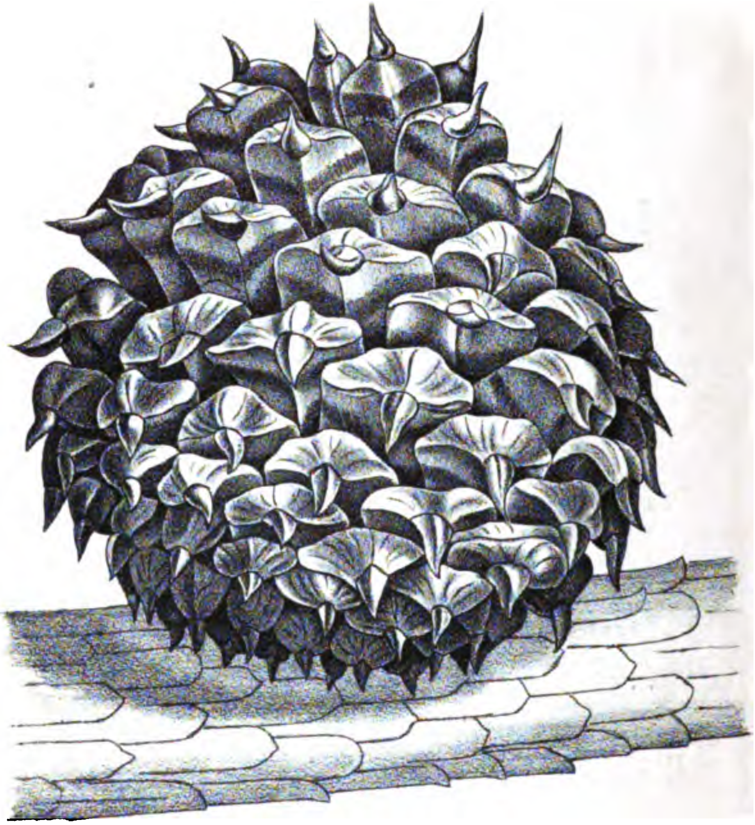


Fig. 2.

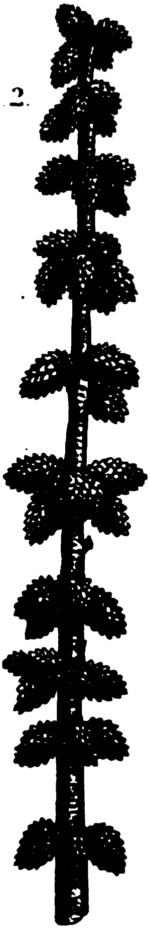


Fig. 3.

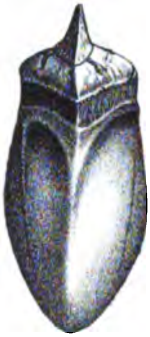


Fig. 4

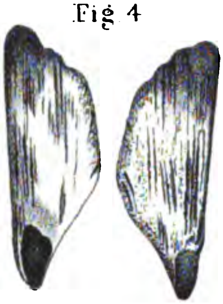
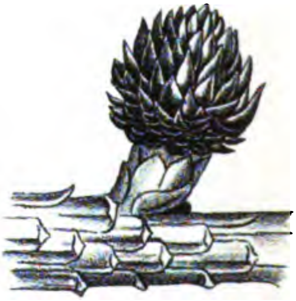


Fig. 5



PINUS PUNGENS. MICHX.

Fig 1. Mature Cone.
Fig 2. Clusters of Cones on a single branch.
Fig. 3. Scale
Fig. 4. Seeds with wings.
Fig 5. Female Flowers.

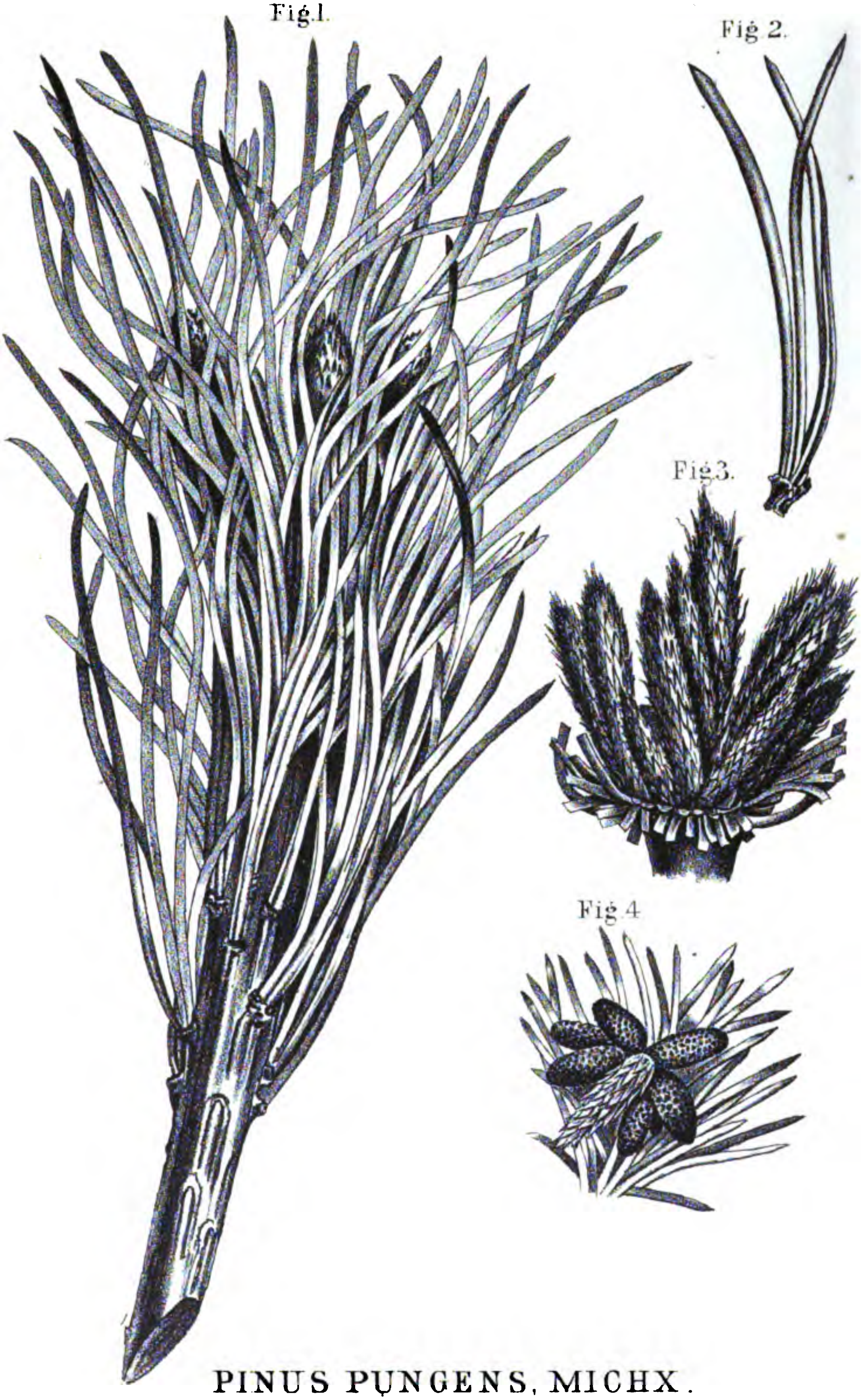


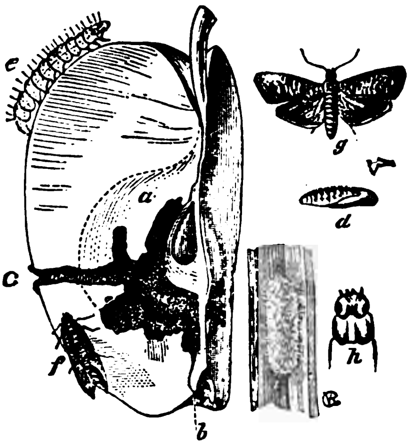
Fig.1.
Fig.2.
Fig.3.
Fig.4

PINUS PUNGENS, MICHX.

Fig.1. Young branch.
Fig.2. Leaves with sheath.
Fig.3. Cluster of terminal buds.
Fig.4. Male flowers.

REPORT OF ENTOMOLOGIST.

Officers and Members of the Fruit Grower's Association:



a. A section of the apple, showing the internal operations of the *larva.*
b. Showing the point where the eggs are deposited.
c. Showing the point of exit.
d. The matured *pupa.*
e. The matured *larva* after it has emerged from the apple.
f. The *imago*, with wings closed.
g. The *imago*, with wings expanded.
h. A magnified view of the head.
i. The cocoon spun in a recess.

GENTLEMEN: I regret that it will be impossible for me to attend the annual meeting of the Association, to be held at Williamsport, on the 16th instant, but I am of so little account, that my absence will not be seriously felt. Allow me, however, on this occasion, to say that during the past season I have practically demonstrated that the "codling moth" of the apple (*Carpocapsa pomonella*) does not confine itself to "pip fruit" alone, as has been so long alleged and believed not any more than the "curculio" does to plums. Although I had previously bred it from the apple, the quince, and the pear, and on several occasions from the peach, yet last season I bred it from the apricot and nectarine, and it doubtless would also attack the different kinds of plums, or at least the better varieties of them. So that the theory that it is strictly a "pip fruit" insect may be considered unfounded or entirely exploded. This information may be of some value to those who had supposed the discontinuance of the cultivation of the apple for a time would eventually annihilate the codling moth. We can neither "head off" the codling, the curculio, nor the potato beetle, by estopping their favorite ailment, for they will always apply themselves to the "next best" which is accessible.

I confess that this is not a very pleasant *fact* to communicate to the Society; but, if the worst is known, we may have a better conception of the ground we stand upon, and may also have a clearer understanding of the extent and sphere of the enemies against which we are contending. If apples alone were involved, we might fight them "on that line" with a reasonable hope of ultimate success; but if other fruits are also in jeopardy, it behooves us to change our tactics, else whilst we are making "headway" in one part of the field, we may be unconsciously "outflanked" in the other. If, for instance, we invest the apple trees with appliances to entrap this moth, and do not at the same time apply them to other trees, it is very likely that many moths may go "scott free" without our knowing it; and, in order to illustrate how numerous they may be among "stone fruit," it is only necessary to say that a resident of Lancaster city, last summer, brought me a quarter peck of nectarines which he had gathered from the ground, and all but ten of them contained the larva of the codling moth; and this was the cause of their premature fall from the tree. Their destruction of the smaller sized stone fruits is more certain and effectual than it is of the larger pip fruit, which is not necessarily destroyed, in many cases, and may even recover or mature after the moths have left it.

When the season is otherwise favorable for the development of apples, pears, and quinces, they may bear the "ingress and egress" of one or two curculios, and as many codlings, almost uninjured, so far as concerns domestic or home use, but a single individual of either of these insects is fatal to the maturity of a plum, a peach, a nectarine, or an apricot, because of their rapid decay, after they have reached the ripening point, which point is often forced prematurely, on account of the presence of these noxious insects. I can distinctly remember the "Codling moth" for more than fifty years, and it seeme to me that there were as many of them, if not more, than there are now. At least I remember the little, active, pink-colored worm, and have surprised many a one in taking a bite out of an apple; but I did not then know that they developed into a moth, nor did any one else with whom I was in socical intercourse. But it was not particularly looked upon as an enemy—indeed it was rather a friend, for it pruned the trees of a surplus crop, which they certainly never could have matured. In proportion to the number of trees planted, the area under cultivation, the increased demand and the diminished quantity of fruit, there seem to be more of these moths now than there were then, but this is only an appearance. Let fruit become and continue as abundant as it was then, and we shall trouble ourselves very little about the codling or curculio. I have been asked why it is that these insects are as plentiful, and often more plentiful, during a season succeeding one in which there were few or no apples. I think I understand this. In seasons when we have no apples in Pennsylvanic, or only a few of them, there is an immense influx of this healthful fruit into the State from the East, the West, the North, and the near South, and many of those apples contain the larvæ of the moth, and when these leave the apples they will spin themselves up within the barrel or box that contains the fruit, and, of course, will be transported with it to different parts of the country. I have seen at least a dozen emerge from a single neglected barrel, in the spring, which had been brought here with apples from abroad. But you must examine closely to detect them, for they seem to prefer an angle in which to spin. Those I confined in boxes always preferred such a place, and at this writing, I have one before me in the angle of a small box, and its envelopment being as white as the inside of the box itself, a casual observation would not disclose it. This, in my opinion, acconnts, in a great measure, for the "milk in the cocoanut." They cannot bridge over the winter in stone-fruit, except so far as they might spin themselves in fissures or clefts in the bark of the trees, but I think the larger nnmber are perpetuated by the apple.

As to a remedy, there seems to be only a single one that is at all effectual, and that is some sort of trap to anticipate their spinning and pupation. Except, perhaps, a bonfire, or its equivalent, during June, July, and August, it will only be so much waste of time to think of any other plan. You cannot "gouge" them out of the apple when they are once in it, and the eggs are too small to detect on the calx of the fruit, as it hangs out of the focus of vision on the tree. There are several forms of this trap, and every fruit grower, no doubt, will have his own. Straw bands tied around the trunks and the larger limbs, and removed about once a week and burned, is the most common trap. A band of some sort of textile fabric, taken off periodically and passed through a clothes wringer, involves the least trouble, and can be used during a whole season; and if it is of a dark color, the enveloped pupa will be more plainly revealed. But where the trees are large and the bark is rough, these traps may be only partially successful, for they will find many little clefts and depressions into which to pupate, without regard to the bands. If these can be removed, they, by all means, should be. Slats, nailed together in the middle, with small spaces between, so as to open like a pair of shears, hung on the trees, are used successfully by some. These traps should be set from the 1st of May and continued to the 1st of August.

S. S. RATHVON.

SCIENCE IN HORTICULTURE.

By S. B. HEIGES, *Professor of Horticultural Chemistry to the Society.*

Horticulture, strictly speaking, is confined to *garden culture*, whether it be the vegetable garden or the flower garden.

The term, however, has lost is strictness of significance, and is applied to the general culture of all forms of vegetable life, either for profit or pleasure.

It includes the cultivation of the vegetable garden, of the flower garden, of trees for fruit, timber, shelter, and shade; in fact, it embraces the consideration of vegetable life in all its bearings.

From its comprehensiveness we discover that it is not a pure science, but is more appropriately classified with the *mixed* sciences.

If we carefully examine the *flora* of the world, we will find certain sections in which certain forms of vegetable life abound; other sections abound in other types of vegetable life. Why this difference? Certain conditions of soil, climate in its fullest significance, and certain properties or qualities possessed by the plant type itself, seem to establish the existence of these types upon various parts of the earth.

The consideration of these conditions induces us to call upon the deductions of geology, vegetable philosophy, physiology, chemistry, physics, meteorology, and, in fact, nearly all of the applied sciences. Hence, the classification of Horticulture with the mixed sciences.

The short time that this Society devotes annually to the discussion of a great range of subjects, compels each one preparing a paper for that purpose to court brevity, often times, we confess, at the exdense of clearness. We can do nothing more than merely relate what has been done in other fields of science having a bearing on horticulture. If mere splendor be taken as the measure of progress, we do not think horticulture has witnessed a more advanced age than that of the hanging garden of Babylon, or that period of the Roman empire when one of their greatest exhibitions of splendor consisted of their magnificent flower gardens.

It must, however, be admitted that the spirit of inquiry, so prevalent in modern times, has developed many facts, of which the horticulturists of ancient times were entirely ignorant.

Beginning with the soil, the home of the vegetable kingdom, the science of chemistry has done much in pointing out what elements it should contain to produce the best results. Then, advancing to the analysis of the various parts of the tree, it has pointed out what conditions of soil are best adapted for the formation of wood, what modifications seem essential for the production of fruit, and what means are best adapted for the preservation of either.

There is but one physiological force, vitality, and this manifests itself in various ways, perhaps in none so wonderful as in the power of germination. Loudet found the vitality of wheat to be inversely to its age. Haberlandt found wheat, barley, oats, and maize, each six years old, possessed respectively of eight, twenty-four, sixty, and seventy-six per cent. of vitality, *i. e.*, those numbers germinated in one hundred seeds used of each in the experiments.

The investigations of Liebig, Schubert, Church, Hellreigel, Boussingault, and Muller, all establish the fact that vitality and productiveness exist to the greatest degree in the *densest* seeds.

Physics have aided investigators in determining upon the absorptive power of many plants, upon the exhaling power, and upon the general flow of sap. From the curious experiments of Hale's, made more than one hundred and fifty years ago, down to the present time, man's ingenuity has been employed in finding out this wonderful operation. The experiments of Peabody, Stockbridge, and Goessmon, in 1873, appear to be the most satisfactory. They report, "this singular periodicity, peculiar to every species, demonstrates that the absorption of water by the rootlets is not caused by osmose, but is the result of the specific life which imparts to every plant its distinctive characteristic."

Entomology has paid her tribute to horticultural science. The investigations of Riley, Le Conte, Fuller, and others, (Rathvon and Stauffer, of our own Society,) have familiarized the horticulturist with the worst enemies the vegetable world has, and devised various means for their destruction. The Colorado beetle, the locust, the codling moth, and other enemies of the vegetable and fruit departments are feared only by the ignorant. The habits of all these enemies have been fully aseertained, and simple means for their destruction have been presented from time to time to horticultural bodies, and man, with his high powers of intellect, should be ashamed to desert the field when assailed by such diminutive foes, though they should advance from all sides as a countless host.

There is not a single insect foe but whose habits of life, by the various appliances that man's ingenuity has devised, may be found out, and whose pernicious influence may not be destroyed or at least controlled. God never designed that the beautiful flowers, majestic trees, and luscious fruits, which were created for man's pleasure and profit, which did not adorn the face of the earth until it was fitted as the habitation of man, should be destroyed by a power less majestic than that which created them.

Microscopy, too, has been instrumental in searching out those more delicate operations of the vegetable and animal kingdoms which the unaided eye must have forever passed by unnoticed. The forms of fertile and sterile pollen granules, the delicate arrangement and operations of the cellular tissue, the curious development of fungus, the intricate movements of various forms of vegetable life, all these, and many more, have been revealed through the agency of the microscope.

The influence of moisture upon pollen, rendering it sterile; upon ripened fruits, hastening their decay or lengthening out their preservation under certain conditions; of temperature, destroying the fruit in the wood or in the blossom, destroying even the life of so-called hardy varieties, and leaving uninjured semi-hardy and even delicate varieties; in thoroughly ripening fruit, by breaking down the cellular tissue, and converting it to sugar, all these and many more phenomena attending this interesting pursuit, remind us that meteorology, especially when aided by chemical laws, should not be passed by unnoticed by those who wish to derive the greatest pleasure from horticultural investigations.

Botany, by familiarizing us with the re-productive organs of the vegetable world, has, at the same time, devised the means by which cross-fertilization may be accomplished, from which process either through man's instrumentality or by the winds and the insect world have sprung the endless variety of fruits of all kinds.

Nature is true to herself, and these seedlings, sports, and crosses, are but the results of laws as yet not thoroughly investigated. Great as the results have been in this direction, greater ones are yet in store for the bold and assiduous student of nature.

When we once admit that the male parent fixes the external type, the form, the size; the female, the internal structure, the qualities, a fact which all my experiments fully establish, we shall begin to *form* fruits and vegetables in accordance with a pre-conceived type.

Not successful in every instance, for in the vegetable as in the animal world, we must contend against those "first intentions," the tendency to throw back to the original type of the family. Glorious results await the close investigator. Let us be vigilant, be active, be unwearied in our labors in one of the most delightful fields that God has created for man's investigation, improvement, and pleasure.

YORK, *January 15, 1878.*

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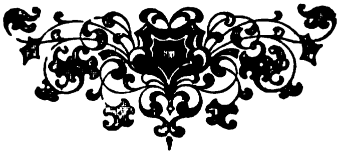

ANNUAL REPORT

OF THE

PENNSYLVANIA STATE COLLEGE.

This institution, designed to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life, is located in the village of State College, Centre county. Under the name of Farmers' High School, it was first opened to students February 16, 1859. While the original intention to give instruction in the science and art of agriculture has been retained, the scope and capacity of the institution have been so enlarged that the original title is no longer appropriate; and that of State College has taken its place.

The college embraces two departments: the collegiate and the preparatory. Three courses of studies are open to students, viz: the agricultural, the classical, and the scientific. In addition, all male students who are not physically disabled or hindered by conscientious scruples, receive instruction in military tactics.

The institution is open to all applicants, without regard to sex, race, or place of residence, who are qualified to perform the required duties, and who conform to the prescribed regulations. Free instruction is given in all the studies pursued, except instrumental music. The only charge made by the college is an incidental fee of twenty dollars a year, to defray the expenses of the recitation and lecture-rooms, public halls, and other conveniences which are enjoyed by all in common.

The number of students in attendance in 1878, has been one hundred and fifty-two, of whom thirty are females.

For the purpose of education, the buildings, farms, apparatus, furniture, &c., belonging to the corporation, is valued at $532,000. The endowment, existing in the form of a bond of the State of Pennsylvania, is $500,000, upon which interest is paid semi-annually at the rate of six per cent. per annum.

The general management of the college is committed to a board of trustees consisting of twenty-three members, of whom twelve are elected for terms of three years each by annual conventions of delegates appointed by county agricultural and mechanical societies, three are elected by the alumni association of the institution, and eight are *ex-officio* members.

The last are the Governor of the Commonwealth, Secretary of the Commonwealth, President of the college, President of the State Agricultural Society, Secretary of Internal Affairs, Adjutant General, Superintendent of Public Instruction, and the President of the Franklin Institute of Philadelphia.

The following persons have been members of the faculty in 1878:

Faculty.

President,
JAMES CALDER, D. D.,
Professor of Mental and Moral Science.

Vice President,
JAMES Y. McKEE, A. M.,
Professor of English Literature and the Greek Language.

WILLIAM A. BUCKHOUT, S. M.,
Professor of Geology, Zoology, and Botany.

JOHN HAMILTON, M. A. S.,
Professor of Agriculture.

JOHN F. DOWNEY, S. M., C. E.,
Professor of Mathematics and Astronomy.

Rev. JOHN S. W. DEAN, A. M.,
Professor of Latin.

ARTHUR GRABOWSKII, M. A. S, Ph. D.,
Professor of Modern Languages.

JAMES F. SLOAN, B. S.,
Assistant Professor in Chemistry.

WALTER HOWE,
First Lieutenant 4th Artillery, U. S. A.,
Professor of Military Science and Tactics.

LOUISA HOLDEN DENT,
Lady Principal, and Professor of Music.

C. ALFRED SMITH, S. M.,
Professor of Chemistry and Physics.

FREDERICK CARLTON ESMOND, A. B.,
Principal of Preparatory Department.

JOHN W. HESTON,
A. RUSSELL CALDER, A. B.,
ANNA M. COOPER,
EDWARD H. CHRISTIE, A. B.,
Assistants in Preparatory Department.

THE COLLEGE FARM.

The College farm consisting of about three hundred acres, is situated at the institution. The soil is limestone, and, according to the geological classification of Professor Rogers, belongs to the auroral formation. It is of excellent natural quality, and is capable of being brought into as high a condition of fertility and productiveness as any land in the State. It is well provided with buildings, stock, and implements suitable for its purposes. The barn is a large, three story bank building, seventy-five by forty-eight feet. There are two dwelling-houses for employés, a large pig pen twenty-two by eighty-three feet, a tool-house, smith shop, power-house, slaughter-house, besides corn cribs, sheds, granaries, etc.

The farm is used for the purpose of giving instruction to the students of the College, and for illustrating the most approved methods of conducting agricultural operations. As a consequence, a system of mixed husbandry is pursued, which embraces most of the processes practiced by farmers in Pennsylvania. It includes the growing of the various grains, as wheat, corn, rye, oats, barley, buckwheat, and the forage crops, such as grass of various kinds, roots, tubers, and the cultivation of fruits, and the care and management and feeding of animals. The effort is to show how farming may be made most profitable. Separate and detailed accounts are kept, showing the cost and profit of the various departments of the farm, as also a summary of the whole. These accounts show for the last twelve years a net annual profit, for every year except one, ranging from four hundred to twenty-five hundred dollars.

When it is remembered that the expenses, owing to the educational feature, are much greater than are necessary upon our ordinary farms, these results will show to a still better advantage.

In the summer care of animals, the soiling system is practiced. No stock is permitted to run at large upon the farm, but all are fed from racks and mangers in the yard, with forage freshly cut, and conveyed to them three times a day. A large saving of manure is thus secured over the pasture system, besides many other advantages, not the least of which is the dispensing with interior fences.

In winter the stalls are filled with cattle for stall feeding. The manure thus manufactured is of the best quality, and placed upon the land increases its fertility more economically and rapidly than by any other system that we have tried. It is hoped by the method pursued, to make the farm highly productive in a comparatively brief period, and while doing this to have it pay its expenses, and a fair profit on the investment.

THE MODEL AND EXPERIMENTAL FARMS.

In addition to the College farm proper, the institution maintains and conducts three "model and experimental" farms, of about one hundred acres each. These are situated one near the college, one near West Grove, Chester county, Pennsylvania, and one near Indiana, Pennsylvania, upon different qualities of soil.

The names "model and experimental," indicates the twofold purposes of these farms. The largest part of each is farmed as a model farm, whilst the remainder is used for the purpose of experimenting. The experiments are upon various questions relating to agriculture, and the list embraces experiments in various methods of culture, rotation of crops, in various kinds of fertilizers, varieties of grains, seeds, &c. These are prescribed by the board of trustees, and number in all about six hundred.

The experimental farms are each laid out in five tiers, of one eighth acre plots, forty plots in each tier. The plots in the tiers are all numbered, the first tier from one to forty, the second from one hundred and one to one hundred and forty, and so on for the third, fourth, and fifth tiers. The same arrangement is had upon each farm, and plot No. 1 of one farm corresponds with plot No. 1 on each of the other farms.

The course of treatment prescribed for a given number upon one farm, is carried out upon the same number on the others. In this way varieties of soil, climate, etc., are observed, and their influence recorded, and, as far as possible, explained. Each year the results upon all the farms are collected and published in the report made to the General Assembly of the State.

These experiments have been now conducted for ten years, and it is expected that when fifteen years shall have elapsed, the results will be taken and compared, and this teaching published for the information of the public.

COLLEGE CAMPUS AND GROUNDS.

The grounds in the vicinity of the College building were originally in the same condition as the rest of the College farm, and whatever of beauty and attractiveness they may now have, is owing, principally, to the labor which has been expended upon them during the last ten years. Unsightly quarry holes have been filled up, useless fences removed, and superfluous and misshapen trees cut away. With scarcely a single natural feature worth preserving, the task was, by no means, a light one, and the labor expressed by these words was much greater than any one, not engaged in the work, would have imagined.

Ample provision had been made, in early years, for a supply of ornamental trees, with which to plant the grounds, when they should be properly graded and prepared. The difficulties and delays incident to such preparations led to the neglect of many of those, so that a much smaller number were used than the size and variety of the grounds now demand.

In an institution of this character, the least collection of trees which is aimed at, should comprise all the native deciduous and evergreen species of the United States. To these should be added, as rapidly as possible, all hardy species, of whatever country and whatever character, if it is desired to make anything of a complete study and illustration of forestry. This phase of the value of trees and shrubbery is, perhaps, no more important than the esthetic one; but, happily, the two can, in this case, go together. Whatever adds to the number and variety of the collection, adds also to its beauty, and to the beauty and attractiveness of the grounds in which they are placed.

The steps which have been taken in this direction have already very much changed the surroundings of the building, and have made them more pleasant and attractive. Moreover, it is the design of the authorities to add to the number as rapidly as possible, so that all of the valuable kinds, at least, may be represented. With the more frequent use of the lawn mowers now in possession of the College, the lawn will become more smooth and uniform; and with proper care and attention, there is no reason why the grounds should not be a source of pride to the institution and to all who have an interest in it.

THE WATER SYSTEM.

The water system of the institution, in point of excellence, is, perhaps, second to that of no other college building in the State.

The water closet and laboratory sinks, on the different floors of the building, connect with pipes passing down into the basement, where they empty into a main line by means of seven traps, which serve the double purpose of preventing egress of sewer gas into the building, and also act as catch basins to retain solid materials which may have passed into the pipes.

The location of these traps with reference to the upright pipes leading to the upper floors, and the ease with which they may be entered, render it possible to quickly remedy any defect or stoppage any where in the main or branch lines. These traps are closed by man-hole plates, bolted down over a gas proof lining of cement, and, finally, each trap has a ventilating pipe passing into the chimney, and carried some feet above the chimney top, thus effectually preventing any accumulation of sewer gas in the traps or pipes.

From the traps the sewage passes, by means of four-inch pipe, into a sink, constructed in the cavernous limestone one hundred and fifty feet east of the College building.

The water closets are supplied with hospital basins, which, being emptied only once or twice per day, act as flushes upon the sewer pipes, thus thoroughly washing them out each day through the entire length of sewer.

The water supply of the College is obtained in limestone rock, at a depth of one hundred and seventy-three feet, from a six-inch artesian boring. The well is tubed, and the water rises to within sixty feet of the surface. The pumping machinery is similar to that used for pumping oil in the Pennsylvania Oil Regions. At each stroke of the engine the water is lifted to the surface, and forced through four-inch pipe to the reservoir, built upon high ground in the rear of the College building, and distant about twenty-five hundred feet from the well. The storage reservoir is sixty feet long, twenty feet wide, and sixteen feet deep; built above ground, of limestone rock, arched over, cemented on the interior, and protected on the exterior by a covering of earth. About twenty hours pumping suffices to fill the reservoir to the hight of ten feet. The reservoir is divided into three compartments by walls ten feet in hight, so that there may always be two compartments reserved for fire or other emergency. This construction also renders any repairs to either compartment posssible, without interfering with the supply to the building. The elevation of the reservoir is such, that when full, there is a head of about fourteen feet of water on the attic or sixth floor of the College building.

The supply pipes in the building pass up into the attic, in the center, and to the third and fourth floors respectively in the wings. There are three inch pipes with attachments on each floor for two inch hose, there being also attachments at several points to the four inch and one inch hose. It is possible, in case it should be desirable, to cut off the supply either at the reservoir or just outside the College building, and drain the entire main or the building pipes into the sewer.

At proper points, there are branch lines to barn, garden, &c., with fire plugs to attach both large and small hose. The hose is coiled on reels convenient to the plugs, so as to be quickly brought into service in case of need.

PRACTICAL INSTRUCTION.

In 1859, when the College went into operation, industrial education was a new question, at least in the United States. In fact, it is necessarily a modern question, being a result of modern science, modern facilities of transportation, modern commercial competition, and modern wants. Formerly, the workman learned, by frequent repetition, to re-produce the model placed before him by his master. The dexterous worker was enabled, by long experience, to turn out, with great rapidity, highly finished work, but for no step in the operation could he give a reason, nor could he improve on his methods, or adapt them to new requirements or conditions. Besides this, the traditions of the trade were a binding law to every artisan, and even to think of departing from usage was treason to the guild. In many places, facility in execution in one's specialty was believed to be diminished by knowledge of other things, consequently education was looked upon as not only unnecessary but positively hurtful.

Probably the first school designed to give technical instruction of any kind is that of Arras, in northern France, founded in 1775 by the States General of Artois. France, however, may claim not only to have been the pioneer in this kind of instruction, but also to have accomplished more in it than any other nation, a fact which is the cause of her continued supremacy in those departments of art and manufacture in which higher training is provided.

The first government school of arts and trades was erected at Chalons, in 1801, by a decree of Napoleon, then first consul, and from that time there has been a continual increase in the number of such schools, some being established by individuals or associations, others by municipalities, and yet others by the national government. In all these, the object was essentially the same, to train the eye, the intellect, and the taste, so as to create a class of workmen who should be able to apply the principles of chemistry, of mechanics, of aesthetics, and of political economy to their work, and thus secure increased cheapness of production, adaptation to use, and perfection of finish, along with such artistic form or brilliance and harmony of coloring as might be demanded in the several products. The results of this provision were seen in the continued and increased prosperity of the several trades into which the pupils of these schools entered. When the World's Fair was held in London, in 1852, the English, for the first time, realized that they were unable to cope with their trained neighbors in the production of works of art and beauty. Even previous to this time a few observing men had perceived the decline of certain branches of English manufacture, and the supplanting of English goods in their own markets; but now the thoughts of almost all classes were directed to the facts, and committees of manufacturers, boards of trade, and royal commissions went to work to investigate the causes of this undesirable state of affairs. With a view, partly to investigate, and partly to remedy the evil, sufficient money was raised, under the auspices of the English Council of the Society of Arts, to send a deputation of eighty skilled workmen, representing a large number of industries, to study the Paris Exposition of 1867, and visit French work-shops and manufacturing establishments. From all these bodies comes back the same answer, that the English workman is inferior to his French competitor in all that pertains to the application of art and science to his work, and that his inferiority is owing to his want of the technical education enjoyed by the French. The English stone-mason reports that the French mason is superior in all art-work, because of his early training in the principles of art, and of the instruction that he has received in drawing and in modeling. The English manufacturer of fancy worsted goods reports that the dyers, whose richness of coloring has cost the English their trade, are graduates of technical schools, and have all the resources of chemistry at their command. The carver in wood finds that his French rival is a draughtsman, who makes his own models, and who, possessing an artistic taste, never works merely mechanically.

The most important, direct, practical result of this investigation and discussion of the importance of technical education is found, probably, in the unanimity of opinion respecting the chief requisites for renewed prosperity in English manufactures. These requisites, in a report made to the committee of council for education by the association of chambers of commerce of the United Kingdom, are stated in the following words: "1. Largely increased primary education. 2. The establishment of schools of science and art in the great centers of industry, aided by government."

This educational movement, which originated in France, having been thus traced to England, will be considered no further in its European phases, since enough has been said to prove its great practical importance.

More than twenty years ago, some far seeing citizens of Pennsylvania, looking at the unscientific character of our farming, and its results already visible in the impoverishment of lands once highly fertile, resolved to establish, if possible, a school in which a young man might learn both the principles and the practice of this calling. This school having been organized as the "*Farmers' High School of Pennsylvania*," its friends laboring in behalf of it and of the cause it represented, joined with other friends of technical education in securing the passage of the act of Congress of July 2, 1862, known as the "congressional *land grant" or "agricultural college" bill.* If the educational provisions of this bill be compared with the demands of the English memorial already quoted, it will be seen, that owing to the excellent free school system already existing in most States, the first need of the English workman did not exist here, but that provision is here made to supply the higher want, "Schools of science and art in the great centers of industry, aided by government," years before that want seems to have been definitely stated in England.

These provisions of the act of Congress are as follows:

"The leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislature of the State may prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

It is probable that the country may yet see that the framer of this act "builded better than he knew" in stating the leading object of the industrial colleges thus established and endowed for the advantage of agriculture and the mechanic arts. The provisions, though they constitute absolute requirements in certain respects, are yet so flexible that in a given State the industrial interest of chief importance may receive most attention.

The problem of industrial education had, in the United States, new elements and conditions, wholly dissimilar to those found in the old world; consequently, the experience acquired and the results attained, as a partial solution in Europe, were of little service for guidance in our country. American pupils generally have a much larger amount of book-learning before they apply for admission to these schools, but they are generally without any practical knowledge of the arts, and, too often, they regard as irksome and slavish those labors which are needful in order to gain this knowledge.

Again, the range of scientific studies in the American school is necessarily greater. For instance, the city of Lyons, having her great silk production at stake, established her technical schools with special reference to the art of designing, to chemistry, to the art of setting up looms to any required pattern, and, in general, to those things which are subsidiary to the production and decoration of the finer class of textile fabrics.

But, in a great State, such as Pennsylvania, with vast agricultural, manufacturing, and mining interests, the number of subjects for instruction must include *all* branches of learning "relating to agriculture and the mechanic arts." Still further, when a republic educates its citizens for positions of usefulness and influence among their fellows, it must educate them to be citizens as well as to be laborers, and therefore it gives them instruction in mental, moral, social, and military science—it makes their education to be not only practical, but, also, liberal.

The necessity for technical education is increased by the fact that, owing to the decay of the apprentice system and to the division of labor in most manufactures, a workman cannot now obtain a knowledge of every part of his calling, and thus grow up to a fitness for the position of superintendent of all the work in the establishment.

Facilities for transportation increase the need of knowledge on the part of the producer. An inferior product can no longer command the market of its own neighborhood, and a good product is not limited to that market; both are brought into competition with the best products of the world.

In order to find ready sale, the steel rails, the tools, and the glass made in Pennsylvania must compare favorably in price, quality, and style with the best products of other places. Even the great grain farms of the northwest find that their product, bulky as it is, must compete in market with Russian wheat from Odessa.

It is plain, then, that the primitive processes formerly in use in agriculture and the arts will no longer prove remunerative, and if our country would continue to hold her present position, she must not only still hold out to inventors the inducements offered by a liberal patent law, but also furnish, to all who desire them, opportunities for securing the fullest acquaintance with the principles underlying all the processes involved in her various products.

Some may suppose that competition and invention have done their work and further improvement is not to be expected, but such is not the belief of those most competent to judge. One of the most eminent English authorities on this subject, Mr. Russell, the builder of the "Great Eastern," speaking of the great loss of mechanical power in consequence of the want of skill in foremen and laborers, used these words: "We know that we are utilizing only one tenth to one twentieth of the power we employ and waste, and that an economy of one hundred, two hundred, three hundred, and four hundred per cent. is quite within our power so soon as a better informed, higher skilled, more perfectly trained class of men and masters shall arise, who are fit to be trusted with the use of instruments and tools at present utterly beyond their comprehension, control, or application to use."

But, while the general principles may be beyond dispute, the organization and management of these industrial colleges in the United States, involve many mooted questions, and among the most difficult, is this: "What is the proper ratio of practical to theoretical instruction?

Some knowledge of labor systems has been gained in reform schools where the criminal and the pauper are instructed in agriculture and other manual arts that they may be able to earn a living, and so be freed from one of the greatest temptations to vice. Again, there is the peculiar experience gained in that which is, perhaps, our best example of a purely manual labor-school, the Boston "Whittling School." It is not needful to present here the various experiments of these schools, nor even of this College and similar institutions in this country, but those experiences range from the entire absence of a labor requirement to an amount of manual labor almost equal to that in the French school of arts and bridges, where pupils spend seven and a half hours daily in the work-shop, and divide five and a half hours more between text-book work and apartments of design.

The system at present adopted in the Pennsylvania State College, does not leave the student wholly unacquainted with practice, and to this extent in the condition of a rude laborer, nor does it propose to give the manual facility attained by the dexterous laborer; but it does aim, after acquainting a student with the principles of the different industries, to give him practice in their various elementary processes, and to continue that practice just so long as is needful to show the relations existing between those principles and processes. This system of instruction for the eye and the hand will now be presented briefly, under the name by which it is here known, that of

PRACTICUMS.

These exercises are intended to cover those lines of industry which are general, and also those which, though not general, are of great local importance, because of some special demand. Some, which are fairly within its scope, the institution has not yet been able to organize and provide with instructors, but, with one exception, none will be discussed in these pages which are not already in operation. The work in each practicum is made progressive, advancing in the natural order, and, not only so, but the practicums themselves are arranged with reference to their difficulties, and to the student's preparation for them, by mental development and by advancement in his theoretical studies.

In general, the practicums are the same for all students, but ladies do not take part in those on the farm and the campus, being provided with others, having special reference to the household. It may be added here, that there is at present one further exception as to the universality of these requirements, viz: That ladies taking lessons in music, may be excused from one half of the time required in certain practicums.

Care is taken that students thus excused shall be present at some time during the consideration of each topic, as all students are subjected to the same examination at the close of the session.

TIME.—The hours of the day are the same for all classes, namely, from one to three, P. M., as, however, the students in the lower classes are inexperienced, and in many instances do not yet know how to study to advantage, a smaller number of hours of practical instruction is assigned to them, the present requirement being six hours per week in the preparatory course, eight hours in the first two years of the college course, and ten hours during the last two years. Not only have the seniors and juniors a greater number of hours per week, but, in most cases, they have their practicums in the laboratories; while the lower classes, who are less accustomed to the confinement of student life, generally have their practice out of doors.

INSTRUCTORS.—Each class, or section of a class, is constantly under the oversight of a professor, whose duty it is to direct the student in his practice and to call attention to the reasons which determine the practice. In the assignment of instructors, here as in the class-room, regard is had to the teacher's adaptation to the special service required, and all members of the faculty, from the oldest to the youngest, are expected to give their best efforts to instruction in practice, as well as to that in theory. The instruction of each session is in accordance with an outline previously approved by the faculty.

EXPENSE.—Every practicum involves greater or less expense, but in most instances the material and tools or apparatus either are supplied by the college without charge—as in botanical analysis, where all students may use the microscopes, &c., provided by the college—or involve but a very slight outlay. In mechanical drawing, however, and in chemistry, students are required to supply themselves with apparatus and material.

TOPICS AND METHODS.—That the working of the system may be more fully understood, a few points are here given, respecting the several practicums.

1. *The Farm.*—That upon the farm is presented first, and most fully, because it comes early in the course, occupies a considerable amount of time—one session in each of the first four years—and is likely to furnish, to most readers, the most intelligible illustration of practical work. The sessions are distributed over the entire year, that the student may become acquainted with all the operations of the farm. For instance, the winter session is needed for instruction in the care of animals, which subject is supplemented by those of farm implements and manures. A few brief statements must suffice for illustration.

The outline of the entire course is comprised under the following heads: "Farm Implements and Machinery," "Tillage," "Animal Husbandry," "Fertilizers," "Improvement of Soils," and "Miscellaneous."

The more detailed statement of the operations of a single session, (the spring session of the freshman year,) is as follows: Plowing, harrowing, sowing grain, planting corn, sowing plaster, planting potatoes, cultivating corn and root crops, cutting grass, cultivating fallows, fixing fences, repairing implements, harnessing teams, hauling and spreading manure.

Each of these kinds of work receives its separate explanation and illustration. For example, under the first topic are considered the management and adjustment of the plow for different kinds of work; the division of the field into sections of proper size and shape; the opening of the first furrow, and the finishing of the last; the turning of the furrow, its depth and breadth, the laying it flat, and the inclining it at an angle, &c. Again: respecting the harness, the pupil is taught how to take proper care of it; to put it together, and take it apart; to put it on the horse, and adapt it for use in single or in double team; and to adjust it for ease of draft in different kinds of work, as plowing, harrowing, wagoning, &c.

2. *The Campus.*—In the practicum on the college grounds, the student learns the laying out, construction, and maintenance of roads, the grading and establishment of lawns, the grouping, planting, and caring for shrubbery and ornamental trees, and the trimming of hedges.

3. *The Garden, the Orchard, and the Vineyard.*—During two sessions, one spring and one fall, the time of the student is given to these subjects, and, as he has already, on the farm, learned about tillage, this time is devoted to gaining familiarity with the methods of propagating, training,

pruning, and, in other ways, caring for garden plants, fruit trees, and grape vines, of destroying their insect enemies, &c.

4. *Surveying.*—The field practice in surveying gives to each student the ability to handle aright the instruments ordinarily used in civil engineering. It also trains him in the taking of such measurements as will determine a required point, distance, or area. The subsequent work of plotting is done in the class-rooms, where the pupil learns to execute with neatness, rapidity, and accuracy, this important part of a surveyor's duties.

5. *The Military Drill.*—This is under the charge of an officer detailed from the regular army, and it includes infantry drill in squad, company, and battalion, bayonet exercises, saber exercises, target firing, and artillery drill.

The time devoted to drill is five hours per week in the spring session, and three hours per week in the fall and winter sessions. This is in addition to the hours spent in the agricultural and other practicums.

The general government details the professor and furnishes both material and apparatus of instruction.

These exercises not only are necessary for a full compliance with the law of Congress, as quoted above, but also are useful, even apart from their value in a military point of view, in training to habits of obedience and command, in giving better control of the body, and in securing a manly bearing.

6. *Botany.*—Some of the time given to this practicum the students spend with their professor in the fields or the woods collecting specimens or studying plants in their homes, the remaining portion is employed in the class-room in dissecting specimens and examining them under the microscope.

7. *Drawing.*—The practical course in this branch is not demanded chiefly for the higher purposes of art, nor, as in some manufacturing districts of England and France, for the production of elaborate models and designs, to be subsequently applied by the silversmith or the carver in wood, by the printer of paper-hangings, or the weaver.

The ability to produce these designs is not recognized as one of the every-day needs of our citizens, and so it must for the present be gained at some special school of art. As, however, almost every one needs, at some time, to execute an intelligible draught of some object, our course seeks to enable every pupil to do this. The course consists of two parts: Free hand drawing from copies in flat outline, which, while giving freedom of movement and speed of execution, trains the eye to recognize beautiful forms and the hand to produce them; and mechanical drawing by the help of instruments, which secures precision.

8. *Domestic Economy, &c.*—As already stated, lady students do not take the course of practical instruction on the farm and the campus, but have, during the sessions spent by their classmates in these practicums, a special course. This is intended to give these ladies a knowledge of the application of science to the work of the kitchen and laundry, a further acquaintance with drawing, and some familiarity with the principles and practice of house decoration.

9. *Chemistry*—The working course in this science has been in full operation almost from the opening of the College, and remains largely the same in its general character, though improved in some of its methods and and appliances.

Beginning with a brief course in synthesis, in order to learn more of the combining relations of elements, the student afterward enters on a course of qualitative analysis, both by the blow-pipe and by humid analysis.

From this, in his later practice, he passes into quantitative analysis. The student learns, also, the use of the blow-pipe in determinative mineralogy.

10. *Mechanical practicum.*—This has already been referred to, as not yet in operation, though its outline has been determined, and plans formed for its early introduction. Some have raised the objection against it, that the variety of operations is so great as to make it impossible to give the student any real knowledge, in the time at his disposal. It should be borne in mind, however, that this multiplicity of processes in the work of the machinist may be reduced to a small number of manual operations, and the numerous tools employed are only modifications of, or convenient substitutes for, a few tools, which are in general use. The uses of the lathe are the same, whether the material is bone, metal, or wood, whether the moving power be derived from the workman's foot, from a water-wheel, or from a steam engine. In like manner, as fitting depends on a correct eye and manual skill, he who has learned to fit in metal, by means of the clipping hammer and the file, will not long find difficulty in fitting wood by means of the saw, the plane, and the chisel.

Mastery over a few tools of universal application, acquaintance with the methods of fitting, and with the ordinary means of transmitting and converting power are, then, the essential points embraced in the proposed course, nor can it be greatly extended without the use of funds not now possessed by the College.

CONCLUDING REMARKS.

The question is respectfully submitted, whether the practical knowledge gained thus, will not, apart from the text-book course which the College presents, help a young man to become a better farmer, as well as a more useful and intelligent citizen? Not only will he derive advantage from the practicums on the farm and the campus, in the garden and the orchard; but he gains, from surveying, the ability to find the contents of a field by taking measurements with such simple apparatus as a piece of rope of known length, and from botany, the means of identifying any plant which he finds: or, if it be not yet described in the books, he can call attention of others to it by an intelligible description, illustrated, if need be, by drawings.

Chemistry has fitted him for detecting, in many cases without apparatus or chemicals, most of the adulterations which are now so common in foods, fertilizers, &c.

The mechanical practicum has drilled him in the use of tools, until he knows how his implements should be constructed, and he knows whether certain combinations of machinery may be expected to produce certain results; he, therefore, is not likely to buy a useless or ill-made tool, and he can superintend the construction of new implements, adapted to his purposes, or even go to the forge, the turning-lathe, or the carpenter's bench, and make them himself.

It may be added, in this connection, that, though all students take the same practicums and so have the same truths brought out in their practice, the work is not necessarily the same with every pupil. Hence, a student who is to be a druggist may receive a course in pharmacy, while the student at the next desk in the chemical laboratory, may receive, in illustration of the same principles, his training in analysis, with reference to agriculture.

But, not only has each part of this system of instruction been helpful to the young farmer, but, as a whole, it has done much for him, by increasing his powers of perception and discrimination. His eye sees, his ear hears, and his mind draws direct conclusions from facts which would escape the notice of the untrained senses, and which, if perceived, would not be apprehended in their true relations.

Some may object that a brief course is, of necessity, wanting in thoroughness. We answer, that all our courses aim to be thorough—to fully present the leading principles in their practical relations—but none of them are exhaustive, taking up everything connected with their subject.

Still further, the body of the student who receives this training is not weakened and enervated, as is that of the ordinary student who leads a sedentary life, but is braced, invigorated, and, in every muscle, brought completely under his control. The vigorous health of those who graduate in this institution, testifies to the correctness of the views here expressed.

As already remarked, some subjects have not yet been provided with a practicum. At present the College is unable to bear the additional expense which would be involved in their establishment, or in the extension of those already existing. She must, therefore, wait for the bounty of the State or the munificence of some wealthy friend of education to furnish the green-houses, the mechanical work-shops, the mining laboratories, &c., needed by the student, and demanded by the industrial interests of the Commonwealth.